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Information technology strategic planning: a case study

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Information Technology Strategic Planning

A Case Study

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Introduction and summary

This thesis is a detailed study of the first attempt by a certain public sector organisation (here referred to as "the Organisation") to follow a formal information technology (IT) strategic planning process and develop its own Information Technology Strategic Plan (ITSP). IT strategic planning is taken to include planning for information systems, information architecture, IT resources, IT infrastructure and telecommunications. The main aim of the thesis is to interpret the ITSP process as it occurred within the Organisation. A subsidiary aim is to contribute to a better understanding of the ITSP process in general.

The research adopted the case study technique to investigate the structures, processes, values and relationships which existed within the Organisation. The study asked the questions:

- Why was ITSP undertaken by the Organisation?
- How was it attempted?
- How and why was it opposed?
- Why did it apparently fail?

The research approach drew on anthropological methods, which have value in investigating social and cultural contexts. Detailed study within the Organisation was carried out using the main research method of cultural anthropology, participant observation. A key concept based on anthropology - organisational culture - was also utilised to help interpret the ITSP process.

The approaches taken by organisations to their strategic planning have been seen to be divided into two main types - "rational" and "processual". The rational approach usually involves top-down, analytical techniques. The processual approach to strategy formation acknowledges that successful strategies are just as likely to emerge from the "grass roots" of an organisation as they are to be systematically planned and imposed from the top.

It is concluded that the overall ITSP process within the Organisation and its outcome can be best understood not as a rational strategy, but as an emergent process which was shaped by the cultural values and understandings which applied at the "grass roots" of the organisation. It is demonstrated that the ITSP process was significantly influenced by the IT governance framework which applied within the Organisation. The most influential features of the IT governance framework were its implicit, as opposed to its more openly acknowledged aspects, which in practice had less influence. It is shown that the implicit IT governance framework was itself shaped substantially by the organisational culture and structure, which in turn were significantly influenced by the history of the Organisation.

In general, it is shown that organisational history, structure and culture can influence one another to form a triad, which can shape another triad consisting of IT governance, information systems and IT strategy. These in turn can influence one another, and can also reinforce the precepts of the organisational culture and structure. It is shown that this model applied within the context of the Organisation.

Although from one perspective the ITSP process undertaken by the Organisation might be seen as a "failure" - it was ultimately abandoned - the actual process and its outcomes appeared logical and made good sense to most participants within the context of the IT governance and the organisational culture.

Plan of the thesis

The thesis is structured in four main parts.

Part 1 outlines the aims of the research, and the research design and techniques adopted. The initial research design is described in terms of its main attributes: the questions asked, the propositions put forward, the unit of analysis, the logic linking the data to be collected to the propositions, and the criteria for interpreting the findings. The case study approach adopted is also summarised.

Part 2 identifies and discusses the particular theoretical approaches and areas of the literature which are relevant to the interpretation of the ITSP process studied. These comprise strategic management and planning, IT strategic planning, anthropological concepts and IT governance. The relevant anthropological concepts include organisational culture and symbolism, and the technique of participant observation.

Part 3 is a detailed examination of the case study itself. The research setting is described in depth, along with the participant observation approach used. The internal culture of the Organisation and its associated symbolism are discussed. Strategic management planning within the Organisation is outlined and analysed, followed by the related issue of internal communication. Information technology in the Organisation is then described and critically analysed under the headings of IT service provision, IT governance, information systems, the IT section, the IT manager, a key earlier IT project and IT strategic planning. The approach to ITSP taken by the Organisation is then analysed further in terms of client/server computing, client/server computing as an Organisation strategy, the further development of the IT strategic plan, and the outcomes of the ITSP process. Part 3 concludes with a critical review and summary of the case study.

Part 4 provides an overall conclusion to the thesis, and a review of its outcomes. It draws further inferences regarding the subsidiary aim of the thesis, that is, to contribute to a better understanding of the ITSP process in general.

Information Technology Strategic Planning

A Case Study

PART 1

Research aims, design and techniques

A number of recent surveys have indicated that information technology strategic planning (ITSP) is a significant issue in many countries, and its improvement is often the highest priority of IT executives (e.g. Baets 1996; Watson and Brancheau 1992: 114-116). In general this literature suggests that the ITSP process does not have highly successful outcomes, and it is not well understood. A prerequisite for improving outcomes is a better understanding of the process itself. The main *aim* of this research was therefore to investigate in detail the ITSP process as it operated within a particular organisation, with the aim of interpreting and understanding it within that context, as far as possible. A subsidiary aim was to contribute to a better understanding of the ITSP process in general.

Research design has been described as a plan or model which guides the investigator in the process of collecting, analysing and interpreting observations. The formulation of an outline research design prior to undertaking detailed fieldwork is recommended as a guide for the collection of data, and can prevent the investigator straying into unproductive detours (Yin 1989: 35-40). It also allows the researcher to draw tentative preliminary inferences concerning causal relations among the variables under investigation (Yin 1989: 28-35). The preliminary research design of this thesis is discussed further below.

The research project utilised the *case study technique*, which has been defined as "an attempt at describing the relationships which exist in reality, usually within a single organization" (Galliers 1992: 151). Yin (1989: 13-20) notes that case studies (as opposed to other techniques such as surveys) are appropriate when "how" or "why" questions are posed, when the investigator has little control over events, and when the focus is on explaining a contemporary phenomenon within a real-life context. These conditions applied to the context of this thesis, as noted below. Moreover the researcher had little control over any of the events described.

Galliers (1992: 154-155) notes that the strength of the case study approach is that it enables the capture of reality in greater detail than is possible with alternative approaches. Its potential weaknesses include the fact that it is normally restricted to a single event or organisation, or both. For case studies, the recommended components of the research design include:

- the case study's questions,
- its propositions,
- its unit of analysis,
- the logic linking the data to the propositions, and
- the criteria for interpreting the findings (Yin 1989:29-35).

In accordance with these recommendations, the components of the preliminary research design for the case study were as follows:

Questions

The study basically asked the questions:

- Why was ITSP undertaken by the Organisation at the time of the study?
- How was it attempted?
- How and why was it opposed internally, and ultimately terminated?
- Why did it apparently fail?

Propositions

The initial propositions of the study included:

- that IT strategic planning is driven by organisational needs and values,
- that IT strategic planning is related in some way to the IT governance of the Organisation,
- that IT strategic planning is related in some way to the information systems of the Organisation, and

that all processes within the Organisation, including IT strategic planning, are likely to be related to its structure and culture.

Unit of analysis

The "unit of analysis" of the study (that is, its scope) was initially defined as the process of development of an IT strategic plan from inception to acceptance of the final plan, but excluding its implementation. It was recognised that the antecedents of the process would also need to be investigated where relevant. The study therefore focussed on the period 1994 to 1996, but also referred to earlier formative influences. The IT strategic planning process studied was actually terminated by events within the Organisation - and this in fact delineated the scope of the study.

Logic linking the data to the propositions

The initial propositions noted above implied that data would need to be collected and observations made in areas which included IT strategic planning, organisational needs, IT governance, information systems and organisational structure and culture. However no prior assumptions were made about the way in which the data might be related to the propositions, beyond the likelihood that they were related in some way. Rather this was the subject of ongoing analysis as the data were collected and events unfolded. This is consistent with the anthropological research method applied (discussed below), which is often data-driven rather than hypothesis-driven. In fact in this approach it would be unlikely that the relationship of the data to the propositions would be known in advance, and this is more usually the subject of investigation.

Criteria for interpreting the findings

No prior assumptions were made about the criteria for interpretation also, but rather these were subject to ongoing assessment as the case study progressed. Again this is in keeping

with the research method used. The criteria for interpretation of an anthropological investigation are generally qualitative, although usually based on the prior experience and proficiency of the assessor.

The components of the preliminary research design as given above were worthwhile as a means of limiting unfruitful detours during fieldwork. However the model stems from the traditional scientific method, although it lacks the rigour associated with that approach. The scientific method is more relevant for investigations of the natural world, rather than social or cultural contexts. A number of writers have noted that research into information systems - and related areas such as IT and information management in organisations - has become increasingly aware of the limitations of the scientific approach, given the explicitly social, or at least socio-technical nature of the field (e.g. Fitzgerald et al. 1985: 5-7; Galliers 1992: 162; Land 1992: 12). These limitations constrained the extent to which the preliminary research design, and in particular its initial propositions, could be applied in practice. Rather these were of value as general guidelines during the course of the case study.

The approach of this thesis therefore draws substantially on anthropological methods, which have value in investigating social and cultural contexts (discussed further in Part 2). Detailed study within the Organisation was carried out using the principal research method of cultural anthropology, participant observation (Spradley 1980). A key concept based on anthropology - organisational culture - was also used to help elucidate the ITSP process (also discussed in Part 2).

The aims, preliminary design and techniques of the research project were outlined in this section, noting that the primary aim was to interpret the ITSP process as it operated within a particular organisational context, utilising the case study technique. A summary of relevant theoretical approaches and literature follows in Part 2, with the aim of identifying and examining those areas which are necessary to achieve an understanding of the approach to ITSP taken within the Organisation.

PART 2

Theoretical approaches and literature

Part 2 introduces and discusses selected theoretical approaches and bodies of literature in the areas of strategic management and strategic planning (including IT strategic planning), broad approaches to strategic planning (including the rational and processual approaches), anthropological concepts and methods (including organisational culture, cultural symbolism and participant observation) and IT governance. The theoretical approaches in these areas are necessary for the interpretation of the ITSP process within the Organisation. They are taken up further in Part 3 and applied where relevant to the case study, to facilitate understanding.

2.1 Strategic management and strategic planning

Strategic management has been defined as:

> "The process of identifying, choosing and implementing activities that will enhance the long-term performance of an organisation by setting direction, and by creating ongoing compatibility between the internal skills and resources of the organisation, and the changing external environment within which it operates (Viljoen 1994: 4).

As Viljoen (1994: 4) notes, this definition implies that the core activity of strategic management is the development and implementation of a *plan of action* for an organisation to ensure its success in the longer term. *Strategic planning* generally focusses on all aspects of strategic management as given in the definition above, with the exception of the implementation of the strategic activities. Although strategic planning may have the short term objective of producing a strategic plan, it is often held that the planning itself is not a discrete, self-contained action but an ongoing process (e.g. Ackoff 1970: 3). That is, if it is to be effective, a strategic planning process should be dynamic and iterative. It is often recommended that a strategic plan should not be left to "gather dust" - it should be regularly reviewed, revised as necessary and any changed arrangements put into practice. These

concepts are discussed further below, in the context of broad approaches to strategic planning.

In this context "strategic" is used as an adjective meaning "relatively consequential", referring both to patterns after actions are taken, as well as to the intentions that may precede them (in accordance with Mintzberg 1994: 27). No distinction is made in this thesis between "strategies" and "tactics", in the sense (often used) that strategies refer to more important things, tactics to the supporting operational details. This usage has a long tradition inherited from the military, where a sharp distinction has historically been made between the senior officers who formulate strategies, and the troops who implement the plans given to them, in the form of operational tactics. However as Rumelt (1979: 197) notes, "one person's strategy is another's tactics.... what is strategic depends on where you sit." Moreover, it also depends on *when* you sit, because what seemed tactical yesterday might prove to be strategic tomorrow (Mintzberg 1994: 27). In the context of this thesis it is shown in Part 3 that what many employees at the operational "coal face" of the Organisation regarded as strategic issues differed from the views of certain key managers.

The general area of strategic management and planning has generated what has been described as a "massive literature" (Knights and Morgan 1995). Even in 1969 one writer could include a bibliography of 38 pages of earlier references on management planning, in a work itself almost 800 pages in length (Steiner 1969). Considerably less has focussed on IT strategic planning. However the overall literature is of highly variable consistency. A quite large proportion does not entail research, analysis or criticism, but comprises prescriptive handbooks, guidelines and the like - and this also applies to the IT planning literature. Mintzberg (1994: 4) suggests somewhat cynically that if the total literature were an ore body, he could find less than three-quarters of an ounce of "gold" per ton in it (that is, about one fifty-thousandth) - referring to studies which have significantly advanced understanding.

This section has provided a brief introduction to the area of strategic management and strategic planning. The following section focusses on IT strategic planning.

2.2 Information technology strategic planning

In the context of this thesis, *IT strategic planning* is taken to include planning for information systems, information architecture, IT resources, IT infrastructure and telecommunications. *Information systems* refer to computer systems designed to provide information to users - including application systems, that is, systems developed specifically to meet certain sets of users' needs. *Information architecture* refers to the overall basic structure of an organisation's computer systems, including the hardware, platforms, systems software and related standards. *IT resources* refer to the physical, financial and human resources needed to support IT. *IT infrastructure* refers to the equipment and software required to support an organisation's computer systems, including its networks. *Telecommunications* refers to the exchange of information (e.g. voice, data, images) between devices separated by a distance, usually via cable or radio. Clearly there is some overlap among the different areas covered by IT strategic planning - this also serves to underline the breadth of its coverage.

IT strategic planning often comprises a significant part of the overall strategic planning for an organisation - although the two are rarely well integrated. IT strategic planning and a major subset of it - information systems (IS) strategic planning - have received increasing attention in recent years (e.g. Battaglia 1991; Boar 1993a; Clarke and Cameron 1991; Earl 1989; Keen 1991; McGee and Prusak 1993; Miller 1988; Pavri and Ang 1995; Premkumar and King 1994; Scott Morton 1991). A major issue in the literature is the extent to which ITSP is aligned with and supports corporate and business strategies, and enables business improvements (e.g. Atkinson and Montgomery 1990; Henderson and Venkatraman 1993). In this context "business" refers to the *raison d'etre* of the organisation, and not just its

commercial aspects. For example, the business of an organisation may be focussed on science, or social welfare. Many writers have suggested that the frequent inability of organisations to derive real value from their IT investments is due in part to a lack of alignment or integration between their ITSP and business planning (e.g. Barlow 1990; Broadbent et al. 1993). A significant part of the literature is therefore concerned with finding or prescribing ways of better aligning ITSP and business strategies (e.g. Broadbent and Weill 1993; Laware 1991; Thurlby 1993).

Pavri and Ang (1995) note that much has been written about information systems strategic planning (ISSP) - a subset of ITSP - but that little empirical work has been done. Their survey of ISSP across 70 Singapore companies included collecting data on the macro-organisation of each firm. This included whether the firm was operationally divided according to function (e.g. finance, personnel), or by product (e.g. food, electronic), or in other ways. They found no significant relationship between the practice of ISSP and the structure of a firm. They suggest that factors other than organisational structure may drive a firm to undertake ISSP, possibly including IS maturity, top management attitudes and environmental complexity. They conclude that additional studies are needed, and that "firm-specific factors" that inhibit ISSP should be addressed (Pavri and Ang 1995: 36-38, 42). However their own data show that if all firms in their survey which are divided by either function or product are taken together - that is, all those with some form of internal divisional structure - then 19 such firms undertook ISSP as against 29 which did not (Pavri and Ang 1995: 36). This suggests that a well developed internal divisional structure may not be strongly correlated with the practice of ISSP. This also tends to support the situation observed in the case study of this thesis, where a marked divisional structure was associated with internal resistance to a particular organisation-wide approach to ITSP (discussed in Part 3).

In order to achieve wide applicability of the results, comparative studies across organisations require a large sample of organisations. However this approach can suffer from the drawback that it may reduce the level of detail addressed in any one organisation, and it can

also "iron out" possibly significant differences among organisations. For example, Pavri and Ang (1995: 41) found that 79 per cent of the firms in their sample which undertook ISSP had an IS steering committee. That is, the presence of a steering committee apparently stimulated ISSP. However a survey does not necessarily reveal the actual effectiveness of a steering committee in any given case. For example, it was largely ineffective in the case study of this thesis (as discussed in Part 3). Factors such as this can call into question an apparent correlation in survey data, and underline the need for careful observation within each organisation. This in turn implies that more detailed studies in a limited number of organisations are needed.

Some important aspects of strategic planning and IT strategic planning were outlined in the sections above, including relevant approaches in the literature. A broad classification of general approaches to strategic planning is discussed in the next section.

2.3 Approaches to strategic planning

The identification of broad approaches to strategic planning as adopted in this thesis relies heavily on the instrumental work of Mintzberg (e.g. Mintzberg 1978, 1994; Mintzberg et al. 1995).

The thesis follows the terminology of Knights and Morgan (1991) in identifying the main approaches to strategic planning as "rational" and "processual". The *"rational"* approach usually entails a top-down, analytical approach (e.g. Ansoff 1990). Some writers refer to the rational approach as "prescriptive" (e.g. Mintzberg 1994). Many proponents of such approaches see the rational model as being prescriptive, or present their recommendations in a prescriptive manner - but not all do so, and therefore the more moderate term "rational" is used in this thesis.

The "*processual*" approach acknowledges that any realised strategy may be either "deliberate" or "emergent", that is, it may be either deliberately planned via a formal process, or it may simply emerge from a complex background of everyday decision-making, values and interests, often via a bottom-up method (e.g. Mintzberg 1994). In this model organisations are seen as subject to cultural, social and political forces which influence strategy. In the processual model, strategy making is holistic and creative, drawing on both quantitative and qualitative information. This includes anecdotal information - often fully accessible only to those who are in close touch with the "grass roots" of the organisation.

The literature demonstrates that when an organisation adopts a rational approach to strategic planing, it often has only limited success (this is discussed further below). In contrast it is shown that the processual approach is more likely to be effective, although it may be combined to a greater or lesser extent with elements of a rational approach.

The thesis moreover demonstrates that the processual model is valuable as a lens to interpret the ITSP process as it actually occurred in the case of the Organisation. That is, the outcomes of the ITSP process are better understood as the product of "grass roots" perceptions and processes within the Organisation - shaped by the forces of the IT governance and the organisational culture - than as the result of "rational" processes.

The two broad approaches to strategic planning are discussed in turn in greater detail in the sections below, and they are also applied where relevant to the case study in Part 3.

2.3.1 The rational approach

The "*rational*" approach proposes that an organisation may choose to follow a logical, systematic strategic planning method, and by so doing is able to develop strategies which provide the focus and direction needed to manage successfully in an uncertain and changing

environment. This usually entails a management-driven, analytical approach which includes such steps as assessing the strengths and weaknesses of the internal environment of the organisation, identifying external opportunities and threats, pinpointing the relevant strategic forces acting on the organisation, identifying some desirable future state, and developing the strategies needed to reach this state. In this model the formulation of strategies is then followed by their implementation, as a separate stage. This general approach dominates the literature (e.g. Ackoff 1970; Ansoff 1965, 1990; Bowman et al. 1983; Earl 1989; Lorange 1980; Steiner 1979). It has been uncritically adopted, adapted or propounded in numerous prescriptive handbooks and guidelines (e.g. guidelines for ITSP such as CCTA 1988 and Finance 1991), in many analyses of strategy processes within organisations (e.g. Earl 1993) and by many business schools and consultants (e.g. as noted in Knights and Morgan 1995: 195).

A basic assumption of the rational approach is that it actually is reasonable and logical, and that if it should happen to fail in a particular organisation (as it often does), the fault must therefore lie with the organisation, not the method. The literature also demonstrates that there is a widespread variability and lack of consistency in actual approaches to strategic management and planning across organisations. A further deficiency of the rational approach is that it fails to account for these variations, but assumes that they arise because organisations in some way lack the necessary knowledge and skills to plan competently (e.g. as noted in Hann and Weber 1996: 1043).

A number of criticisms have been made of the rational approach *per se*, and specific aspects of it (e.g. Mintzberg 1994; Mintzberg et al. 1995; Mintzberg and Waters 1985). For example, a detached, objective assessment of the "strengths" and "weaknesses" of the internal environment of an organisation is rarely achievable (Mintzberg 1994: 276-279). It is often possible only in relation to a particular context, and then the assessment might vary according to the activity. For example, Hofer and Schendel (1978: 150) point out that "one cannot tell whether it is a strength or a weakness to be seven feet tall until one specifies what the tall individual is supposed to do." No organisation can ever be completely sure in

advance whether a capability it possesses, or the lack of such capability, will prove over time to be a strength or a weakness. Mintzberg (1994: 279) concludes that "strengths and weaknesses can be detached neither from each other, nor from specific contexts, or from the actions to which they are directed."

The analytical basis of the rational approach has been criticised, to the effect that the overall process is reduced to a complex series of elementary steps, which are then expected to operate in their totality to more effectively align the organisation with its environment and to promote business success (Mintzberg 1994: 191, 298-303). In the example of Texas Instruments, its planning system factored the corporate objective into nine sub-objectives, each of which gave rise to several strategies, for each of which there was a strategy manager. Each strategy was in turn to be implemented via several tactics, on which progress was reported monthly. With the benefit of hindsight, the planning manager later said of the discontinued system, "....we had the tendency to substitute mechanics for thought .... People would fill out forms thinking they were doing strategies. It was strategy by cookbook" (quoted in Mintzberg 1994: 301-302). Such planning is intended more to be carried out by the automatic application of formal procedures and systems, than by and through people in the course of their normal workplace activities. The analytical basis of the approach and its focus on simplistic form-filling discourages commitment by those expected to make it work.

The rational approach to planning has been compared with that of Taylor (1913) to factory production, in which work was analysed into its elementary components, which were then reassembled into tasks with the aim of achieving maximum efficiency, but at the cost of removing all traces of creativity and discretion. Mintzberg (1994) concludes that, "The [real] process of strategy formation simply has different needs - for creativity and synthesis, which depends on the discretion of informed actors. The work of creating strategy cannot be programmed like that of shoveling coal. Taylor's engineers could put the steps back together into an efficient job; Texas Instruments' planners never could" (Mintzberg 1994: 302-303).

The rational approach is further criticised by Mintzberg (1994: 294-297), who notes that within its typical series of elementary steps, "at the heart of the process where strategies are supposed to be created, you will find only a set of empty platitudes, not any simulation of complex managerial processes.... At best, planners offered checklists: 'analyze the problem', 'select the preferred course of action', etc." However Mintzberg (1994: 319-321) points out that rather than being analytical, linear, sequential and orderly, successful managerial work is typically simultaneous, holistic and relational: "Managers revel in ambiguity and exhibit few patterns in their work, presumably because they spend so much time operating in the mode of synthesis." Similarly, they "may resist steplike structures because the procedure they prefer is basically holistic in the sense that all steps are considered *simultaneously*" (Weick 1983: 240).

A more effective process of strategy making, according to Mintzberg (1994), would draw on all kinds of information inputs, including both "hard" (factual, quantitative data) and "soft" (qualitative, verbal and anecdotal information). The "soft" information is often accessible only to strategists who are in close touch with the operational details of the organisation, rather than detached from them. The process requires insight, creativity and synthesis. The literature of the rational school rarely acknowledges or allows for these factors, but is permeated with a "*normative naivete*.... confident beliefs in what is best, grounded in an ignorance of what really does work" (Mintzberg 1994: 226-227).

The inherent inflexibility of the rational approach has also been criticised, both as an undesirable quality in itself, and because it can inhibit major change occurring in an organisation. This inflexibility is the antithesis of creativity, which is capable of overturning dysfunctional preexisting categories. For example, Mintzberg comments that "planning almost inevitably overlays.... existing strategies as well as its own procedures on the existing structure of the organization. In other words, organizations develop their plans in terms of the subunits they already have - be they functions, divisions or departments.... Planning in terms of the existing categories discourages the reordering of things, which is generally a prerequisite to major change - strategic as well as structural.... Being subjected to planning

means being locked into set categories that generally discourage real creativity" (Mintzberg 1994: 177, 180). Many writers proclaim a need for "flexible planning" with the ability to respond quickly to changes in the environment (as noted in section 2.1). However the main thrust of the rational approach is to promote *stability*: "flexible planning remains just another oxymoron, a reflection of vain hopes rather than practical realities.... planning by its very nature opts for stability over adaptability.... The very reason organizations use planning is to be inflexible - to set direction" (Mintzberg 1994: 184-185).

The military origins of the term "strategy" have been referred to above, as well as its associated sharp distinction between strategy and tactics. This, combined with the inflexibility of the rational approach, have underscored some of the greatest failures of the rational approach. For example, the planning of the World War I battle of Passchendaele was carried out by senior officers in almost total ignorance of actual conditions in the field. The weather was not regarded as a strategic issue, merely a tactical detail to be dealt with on the ground. As a result, British troops were repeatedly ordered to advance through a sea of mud - many, laden with heavy ammunition, slipped into rain-filled shell craters - and 250,000 died. Mintzberg comments that "anyone who has spent time in the world of organizations knows that similar behaviors are all too common" (1994: 187).

As a more recent example, Mintzberg (1994: 117-121) refers to one the most extensive failures of rational strategic planning, the planning-programming-budgeting system (PPBS) adopted by the United States government in the 1960s. Many saw the attempt of PPBS to plan strategically at a high level as being at odds with the reality "on the ground"- the archetypal example being the failure of US policy planning in the Vietnam war. Mintzberg concludes that "PPBS.... proved no more adept at realizing its intentions than any other planning model. Stating an intention to plan strategically and to couple this with programming and budgeting did not achieve anything...." (Mintzberg 1994: 121). It is perhaps ironical that PPBS was introduced uncritically to many government departments in the 1980s as "program budgeting" (or similar), and is still followed in essence by many. In sum, Mintzberg (1994: 97) concludes that, "At the very least, we have found that [rational]

planning is not 'the one best way', that it certainly does not pay in general, and that at best, it may have some suitability in particular contexts."

Within the rational approach, some writers have tried to accommodate various aspects which have been seen as obstacles to its success. For example, Earl (1989: 70-76) proposes that successful IS strategy formulation could include a combination of top-down and bottom-up methods. As another example, it is proposed by some that through "stakeholder analysis", the wants and needs of all the different groups and individuals who could influence the outcome could be investigated systematically and factored into the planning process (e.g. Freeman 1984). This requires the planning team to identify all stakeholders, their "stake" in the organisation, their degree of influence, the criteria they use to judge the organisation and how well the organisation has performed on those criteria. However such an approach glosses over the substantial problems of undertaking a comprehensive stakeholder analysis, and reconciling the often conflicting interests of the stakeholders.

Another suggested accommodation is to include organisational culture within the rational approach. For example, Schwartz and Davis (1981) propose that planning should include:

> "Step 1: Define the relevant culture and subcultures of the organisation....
>
> Step 2: Organize these statements about the firm's culture in terms of managers, tasks and their key relationships....
>
> Step 3: Assess the risk that the company's culture presents to the realization of the planned strategic effort....
>
> Step 4: Identify and focus on those specific aspects of the company's culture that are both highly important to strategic successes and incompatible with the organizational approaches that are planned" (Schwartz and Davis 1981: 47).

This proposal demonstrates a basic misunderstanding of the deep-seated and fundamental nature of organisational culture. Mintzberg comments that the method would need "a blind eye to how it violated the natural functioning of the organisation.... To take culture - so

deeply rooted in the history and traditions of an organization.... and work it into the pat procedures of the planning cycle seems extraordinarily naive " (Mintzberg 1994: 145). The actual character of organisational culture is discussed further below.

The first of the two broad approaches to strategic planning (rational) was described and criticised in this section. It was shown that the rational school entails a logical, analytical process, which assumes that an organisation is able to develop strategies which provide direction in an uncertain environment. It usually entails a top-down, management-driven approach. It was demonstrated that the rational approach often has only limited success.

The other broad approach to strategic planning (processual) is summarised and discussed in the next section. It is shown that the processual approach is more likely to be effective, although it may be combined with aspects of a rational approach.

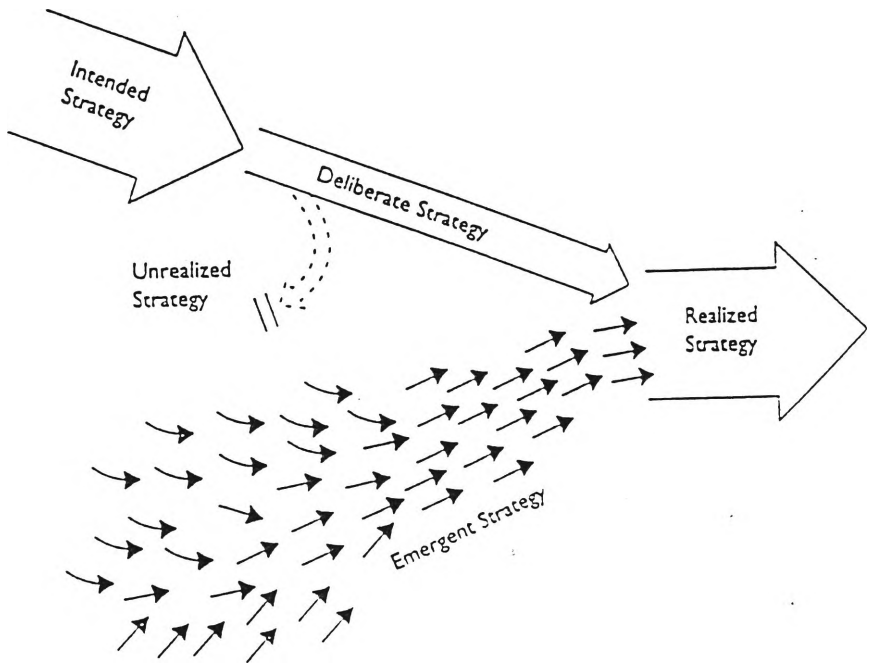
2.3.2 The processual approach

This section provides evidence to support the proposal that the processual approach to strategic planning is the most effective, and that it is also valuable as a "lens" through which the actual processes which occur in an organisation can be better interpreted. Again, it relies heavily on the influential work of Mintzberg (e.g. 1994).

Mintzberg (1994: 23-27) notes that the term "strategy" has at least two connotations - *intended strategy* (that is, plans for the future), and *realised strategy* (that is, consistent patterns in past behaviour, often only recognised after the event). Not all intended strategies are necessarily realised, but some may be - these comprise *deliberate strategy* (see Diagram 1). Those not followed are *unrealised strategy*. Mintzberg (1994: 25) identifies another key type, *emergent strategy*, which is followed in cases where a pattern is realised in practice but was not expressly intended. For example, an organisation may make tentative small, low-level decisions of a certain type one by one, each based only on its own merits,

until a broader pattern emerges, and the organisation realises it has adopted a successful new strategy. The strategy was neither deliberately intended nor rationally planned, but it may have great significance for the organisation. Mintzberg (1994: 25) gives the example of a company which makes diversification decisions one by one, in effect testing the market. First it buys an urban hotel, next a restaurant, then a resort hotel, then another urban hotel with restaurant, and then another of these, until a pattern or strategy emerges of diversifying into urban hotels with restaurants.

Diagram 1 - Types of strategy (from Mintzberg 1994: 24)



The *"processual"* approach is therefore a viable alternative to the "rational" school (e.g. Mintzberg 1978, 1994; Mintzberg et al. 1995). A key insight of this school is that realised strategies are seen as being either "deliberate" or "emergent" (e.g. Mintzberg and Waters 1985), that is, they may be either deliberately planned via a formal process, or they may simply emerge from a complex background of everyday decision-making, values and individual and group interests. In this model organisations are seen as complex, and highly subject to cultural, social and political forces as well as to rational, top-down management. In such an environment an organisation may attempt to undertake rational strategic planning - but the outcome is often unsuccessful, and more often it is emergent strategies which are actually followed.

In the processual model, strategy making is a holistic, creative and relational process, drawing on all kinds of information, including both "hard", quantitative data and "soft", qualitative information. The "soft" information is often intuitive or anecdotal, and accessible only to those who are in close touch with the "grass roots" of the organisation (e.g. Mintzberg 1994: 226-227).

If a top-down approach is able to access or "tap into" emergent strategies, for example, by using a process of wide participation by employees, it may be, or may appear to be successful, and its strategies may be widely followed. That is, if the leaders are able to probe deeply into the organisation or else people deep within the organisation are able to influence strategy, the process can be effective (Mintzberg 1994: 273-274). Mintzberg (1994: 286-287) contends that the dichotomy between the formulation of strategy and its implementation - as promoted by the rational school - is actually artificial and inappropriate, and that the process is best characterised as continuous strategy *formation* or organisational learning. If the "formulators" of a plan are also simultaneously its "implementors", effective strategy making is possible.

Mintzberg (1994: 287-289) identifies two main variations of the emergent strategy formation process: centralised and decentralised. In the first, the formulator implements, that is, a leader monitors the impact of his or her decisions closely and personally, so that a strategy can be continually assessed and reformulated during implementation. The decentralised situation may apply in a case such as a research laboratory, where strategic thinking cannot be concentrated at the centre. In such a case the implementors may also be effective formulators of strategy. In some cases an emergent strategy may have its origins in some particular initiative undertaken within the organisation. Mintzberg (1994: 287-289) describes such a situation as the grass-roots model of emergent strategy formation, where strategies may initially grow like weeds in a garden, and are not cultivated like tomatoes in a hothouse. Such strategies may proliferate to pervade the organisation, whether this is intended or not. If such a process is recognised and properly managed, it may in fact lead to the emergence of good strategy. That is, the "weeds" might turn out to be a valuable crop, and may take over the garden.

Earl (1989: 76-77) suggests that successful strategies may emerge in part from "bright spark" managers who generate innovative ideas which are subsequently adopted. Many strategies are in fact at least partially emergent. The process by which some emergent strategies may come to be more widely adopted within an organisation (in the absence of management decree) can be related to the informal sharing and learning of values within the organisational culture, among its members. Mintzberg (1994: 25-26) notes that in practice few actual strategies are either purely deliberate or purely emergent. The first suggests that an organisation cannot learn from its own experiences, and the latter suggests a lack of control. Mintzberg (1983; 1994: 412-413) notes that organisations which in effect have strong internal cultures tend to reject attempts at formal strategic planning, but rather rely for overall coordination on the standardisation of norms through socialisation within the culture. Organisations sometimes take advantage of this situation by pursuing "umbrella" strategies, with the broad outlines being deliberate while the details are allowed to emerge within them. Such an organisation in effect "learns" (Mintzberg 1994: 209-210), and

significant changes are possible, in contrast to the rational planning approach. However the two types (deliberate and emergent) remain a useful aid to understanding organisational processes.

Knights and Morgan (1995) note that both the rational and the processual approaches "tend to take for granted the historical self-formation of strategic discourses and practices" (1995: 196). They propose that it is necessary to undertake detailed study within an organisation, in conjunction with study of its history and environment, in order to first understand the conditions which make strategic discourse (that is, discussion of strategy) possible within the organisation, and then to understand the actual approach taken to strategic planning. They found that in the organisation they studied, although from one perspective its IT strategic planning process could be regarded as a "failure", the process actually made good sense within its unique organisational and political context (Knights and Morgan 1995: 197-212). This interpretation has parallels with the case study of this thesis (examined in Part 3).

It was shown in the section above that the processual approach to strategy making entails a creative process, drawing on both quantitative data and qualitative or "soft" information. The "soft" information is intuitive or anecdotal, often stemming from the "grass roots" of the organisation. A key insight of this school is that realised strategies may be either "deliberate" or "emergent" - that is, they may be either deliberately planned, or they may emerge from a matrix of everyday decisions, values and interests. In practice few actual strategies are either purely deliberate or purely emergent. It was shown that the processual approach is also valuable as a "lens" through which to interpret organisational processes in general.

The two broad approaches to strategic planning (rational and processual) were described and assessed in the sections above. The rational approach usually involves top-down, analytical techniques. The processual approach acknowledges that successful strategies are just as likely to emerge from the "grass roots" of an organisation. Evidence was presented

that a processual approach is likely to be more effective than a rational approach, although in practice elements of both may be successfully combined.

Further theoretical approaches and areas of literature necessary to interpret the ITSP process in the Organisation are discussed in the following sections - namely anthropological concepts.

2.4 Anthropological concepts and methods

The anthropological concepts and methods which are necessary for the interpretation of the Organisation's ITSP process are organisational culture, symbolism and participant observation. These are discussed in turn below, and they are also applied where relevant to the case study in Part 3.

2.4.1 Organisational culture

The concept of organisational or corporate culture has drawn on earlier insights taken from the anthropological study of the cultures of human groups (e.g. Foster 1969; Kluckhohn 1957), in terms of defining culture in general as a set of behaviours, customs, rituals, beliefs and values within a broader environmental setting (e.g. Bellingham 1990; Boisot 1987; Deal and Kennedy 1988; Passfield 1989; Pheysey 1993; Schein 1985, 1990). Within the anthropological approach, the social organisation and structure of a group are generally seen as being either closely related to or part of its culture. A significant aspect of culture relates to the distribution of status and power within the group, including the power to make key decisions, and to have others comply with them.

The notion that an organisation could possess a distinctive culture in a manner similar to that of other groups in society has developed over the past fifty years. For example, Jacques (1951) cogently described organisational culture as:

> "The customary or traditional ways of thinking and doing things, which are shared to a greater or lesser extent by all members of the organisation and which new members must learn and at least partially accept in order to be accepted into the services of the firm." (1951: 251)

An important element of this understanding is that cultural values are shared by many members of the organisation, and are transmitted to and absorbed by new members in order for them to be fully accepted into, and to operate effectively within the organisation. That is, organisational culture has a powerful influence on the beliefs and behaviour of its members, including their decision-making behaviour.

Duncan (1995: 180-181) notes that organisational culture may include shared mindsets (such as values, norms, understandings, assumptions and ascribed meanings), physical aspects (such as buildings and other artefacts), rituals (including ceremonies and other meaningful patterned behaviour), symbols, organisational stories (such as histories, legends and myths), and culture heroes, that is, highly respected figures such as "founding fathers". The elements of a culture are often strongly influenced by its history and the shared experiences of its members. Conversely, the culture of a group is often a formative influence on the events which contribute to its history.

As understood within cultural anthropology, the values, beliefs and assumptions of a culture are deep-seated and usually long-established - they are not superficial or trivial, and only rarely recently introduced. To include superficial fashions as a significant part of "culture" has little explanatory worth, in the anthropological model. For example, it may be appropriate to include "high physical fitness" as a significant value of the organisational culture of a military unit, but it may not be appropriate to do so for an organisation which has only recently introduced fitness sessions for employees, even if many attend them.

Because the components of a culture are deep-seated, they are highly resistant to change, and significant cultural change normally occurs only very slowly - typically over generations.

In this context a "generation" refers to the typical length of tenure of members of an organisation - for instance this might be 10 to 20 years. This also implies that an organisation's culture can normally be changed significantly and rapidly by its leaders only with great difficulty (e.g. Viljoen 1994: 480-486), in the absence of major turnover in the membership of the organisation.

Organisational culture was introduced in this section. The next section discusses the way in which aspects of a culture may be expressed in symbols.

2.4.2 Symbolism

Significant values and beliefs of a culture are often represented by and condensed into cultural symbols, which are invested with shared meanings and understandings by the members of the society or culture (e.g. Firth 1973). Such a symbol may be tangible, such as a flag, document, mountain or monument, or it may be intangible such as a concept, motto, anthem or legend. Whatever form it takes, it is capable of representing certain principles of a culture or organisation, and reinforcing their importance in the minds of members.

Symbols may also be private, that is, individuals or small groups may invest a particular symbol or *emblem* with certain sets of meanings not shared generally within the culture (e.g. Firth 1973). In some cases such private symbols may over time become more general, and may evolve into broader cultural symbols.

A culture, organisation or group may have one or more dominant or key symbols, which represent certain of its core tenets and assumptions. For example, "the Cross" is a dominant symbol of Christianity, "Mecca" of Islam and the "Red Cross" is widely recognised as the symbol of an international organisation. In other contexts, "the environment" is a key symbol for many conservation organisations, "Anzac Day" for the Returned and Services

League of Australia, and "the home" is highly significant for many Australian families. Clearly in cases where cultures or groups overlap, a single person may recognise more than one key symbol.

A dominant symbol may have a range of referents or meanings which are polarised into two main groups: those which refer to aspects of the prevailing social order, social categories and values (the "normative" pole), and those which have physiological associations and which appeal to the emotions, desires or appetites of members of the culture (the "orectic" pole) (Turner 1967; 1987: 174-175). The two poles of meaning of the one symbol act together to reinforce the cultural principles they represent. For example, "the Constitution" is a dominant symbol shared by many citizens of the United States of America: the political and social order which its contents established (including the "body politic") is reinforced by the strong emotions and desires which it now evokes.

Symbolism as an aspect of culture was outlined in this section. The next section introduces a key technique of cultural anthropology, participant observation.

2.4.3 Participant observation

Detailed study within a culture or an organisation is most effectively carried out using the principal research method of cultural anthropology, participant observation (Spradley 1980). Although this approach was first developed for the ethnographic study of non-Western cultures (e.g. Malinowski 1927), it can equally be applied to organisations and industry (e.g. Britan and Cohen 1980; Chapple 1941; Gardner and Moore 1964; Gregory 1983; Warner and Low 1947).

In this approach the observer is also a participant immersed in the relevant culture or organisation, and studies it in detail from the point of view of its own members. The researcher must be prepared to investigate and critically analyse the unquestioned, "taken

for granted", usually undocumented (and often unarticulated) assumptions, values and behaviour of the members of the culture. The researcher is concerned primarily with the meaning and significance of events as interpreted within the culture, and not necessarily their frequency (Van Maanen 1979).

The approach aims to interpret a culture or organisation by means of ethnographic "thick description" of the complex fabric of everyday structures, processes and discourse (Geertz 1973: 6-10) - as opposed to the "thin description" which may result from a survey spread across many target groups. Geertz (1973: 9-10) writes, "What the ethnographer is faced with... is a multiplicity of complex conceptual structures, many of them superimposed upon or knotted into one another, which are at once strange, irregular and inexplicit, and which he must contrive somehow first to grasp and then to render." A participant observer must also function as a major instrument in the study (Schwartzman 1986: 241), which implies that he or she may also influence the research setting to some extent. Participant observation requires detailed understanding of the culture or organisation. Various methods can be used to achieve this, typically including close observation of processes and events, extensive open-ended discussions, cultivation of knowledgable key informants, examination of records and to some extent, surveys. However surveys often have only limited ability to reveal deep-seated, largely unarticulated beliefs, unless combined with in-depth discussion and observation.

The use of participant observation and anthropological methods in studies of organisational behaviour has been recommended by a number of writers (e.g. Sayles 1973; Schwartzman 1986; Van Maanen 1979). In this vein Campbell (1977: 51) noted that, "There have been few observational studies of what organizations actually *do*.... observations of actual behaviour are rare." To some extent this is still true, although there have since been a number of studies of specific organisations or industries (e.g. Charlesworth et al. 1989; Knights and Morgan 1995).

The fundamental anthropological concepts needed for the interpretation of the ITSP process in the Organisation - culture and symbolism - were introduced in the sections above. These concepts are applied as required in Part 3. The final area in terms of theoretical approaches required for this purpose - IT governance - is discussed in the next section.

2.5 Information technology governance

The term *governance* refers to the framework, or set of rules and guidelines which determine the distribution of roles, responsibility, accountability and decision-making power in an organisation (e.g. Peters and Savoie 1995). The framework may be explicitly formalised and documented, or it may be implicitly understood by members of the organisation, or there may be some combination of the two.

Along similar lines Mintzberg (1994: 196, 200) refers to "politics" as the arena of influence which is beyond the formally sanctioned system of authority of the organisation. In this respect organisational politics form a close parallel to implicit governance. Mintzberg (ibid) notes that organisational politics are often cited within the rational school as being inconvenient and "irrational" obstacles to successful strategic planning. However when informal politics are used to challenge formal authority which is itself attempting to impose detrimental strategies, the politics have to be considered not as an obstacle but as a positive, constructive process. Moreover politics, whether formal or informal, are in all cases a legitimate consideration within the broader anthropological approach (compare Fortes and Evans-Pritchard 1970).

The *IT governance* of an organisation comprises the implicit or explicit guidelines that determine the division of IT roles and responsibilities, how IT decisions are made, how IT resources are allocated, and how related processes and information are shared among the component units of the organisation. In cases where an organisation is not solely responsible for its own IT, the role of IT service providers is also likely to be included in the

IT governance framework. The role of customers or clients in influencing IT decisions may in some cases also be a significant part of the governance.

A number of writers define IT governance as consisting only of explicit guidelines (e.g. Raphaelian 1995; Tunick 1996). Such writers generally argue in favour of having formal rules of IT governance, to avoid any misunderstanding or conflict within the organisation. However a key insight of the definition given by Shipley (1995: 1) is that it includes the implicit or informal guidelines which often comprise a significant portion of the IT governance framework which operates in practice. Even in cases where formal rules do exist, it is often the unwritten, implicit rules which are drawn on in making key decisions. For example, in an organisation with highly autonomous component units, it may be widely understood (but not explicitly formalised) that each unit will normally make its own significant IT (and business) decisions. Shipley (1995: 2) notes that many organisations develop formal IT governance guidelines from the top down, but in so doing may not acknowledge the significant implicit decision-making power of their units. That is, key attributes of the structure and culture of an organisation may have considerable influence on the style of IT governance which applies in practice.

Hess (1995: 1-2) expands the concept of IT governance by noting that it includes the processes for how IT policy, resources and architectures are established, deployed, managed, enforced, amended and retired. As such IT governance has parallels with the political process of governments, including such components as a government executive, constituents, a legislative body, a legal code, a judicial body, a bill of rights and an amendment process (Hess ibid). In some political processes all such components may be explicit, in others key components are implicit - for example, some national constitutions (such as Australia's) have many implicit connotations, which may require clarification through judicial processes. The comparability of IT governance and political processes means that in broad terms, particular styles of IT governance may be compared with political regimes, and may be described for example as democratic, autocratic, federated, socialist, and so on.

As such the IT governance framework is often shaped by, and is part of the broader framework of organisational culture (see also Diagram 2 below). A significant aspect of organisational culture relates to the distribution of power within the group, including decision-making power (as noted above). The way in which IT decisions are made within an organisation typically parallels the broader distribution of decision-making power.

Often the most visible outcome of an organisation's IT governance framework is its set of information systems and their nature. For example, a federated IT governance may result in systems which are fragmented across organisational units, with little overall coordination. In cases where the information systems have evolved over a number of years, they in turn may exert a significant influence on the style of IT governance. For example, the need to maintain separate large legacy systems within a number of different organisational units may discourage the emergence of an integrated, corporate style of IT governance.

Raphaelian (1995: 1-2) notes that the predominant IT governance style of the 1960s and 1970s was authoritarian or technocratic, based on the technological decision-making power of the central IT group. This style of governance had parallels with theocratic regimes (similar to that of Tibet under the Dalai Lama) - absolute power was centred in a technical "priesthood", which possessed arcane IT knowledge not held by others in the organisation, and which used this to make unilateral decisions believed to be in the best interests of the organisation.

However the "PC revolution" of the 1980s largely undermined the authoritarian IT governance style in many organisations, leaving decision-making power fragmented between the central IT group and the distributed users. Looking from the top of the organisation, this situation often appeared anarchic. Raphaelian (1995: 1-2) notes that many organisations subsequently failed to formalise their IT governance framework, leaving organisational units to make whatever decisions they believed necessary to "get the job done". In many cases this resulted in inconsistent IT standards and approaches across the organisation, and "pollution" of the information architecture.

Although these observations are no doubt true for many organisations, they do not explain why many organisations failed to formalise their IT governance framework after the "PC revolution" abated in about 1990. It is argued in this thesis that in the case of the Organisation, this was largely due to the influence of an internal culture which fostered the autonomy of organisational units, and which resisted the development of a strong central IT governance (discussed further in Part 3). While the PC revolution did have some effect in the Organisation and its predecessors, it could not fully account for the observed situation, since most corporate systems were mainframe-based and maintained centrally.

Organisations using IT usually follow some particular overall IT strategy at any given time, whether formalised or not. A key outcome of an IT strategy is often a set of information systems (IS) - and ISSP is usually a major subset of ITSP. Normally the IT strategy is set within the IT governance framework, whether this is explicit or implicit. Implicit IT strategies often emerge within the context of an implicit IT governance framework, and both may be influenced or shaped by the organisational culture. Typically an ITSP process includes the identification of strategies for the allocation of IT resources among organisational units - which is also a key element of IT governance (Shipley 1995). If IT strategic planning is undertaken, to be successful it must normally be in accordance with the prevailing principles of IT governance. As such it is important to investigate the style of IT governance as a significant factor in understanding the particular approach to ITSP adopted within an organisation, and its success or failure. As shown above, in order to fully apprehend the IT governance framework, it is often necessary to understand the organisational culture.

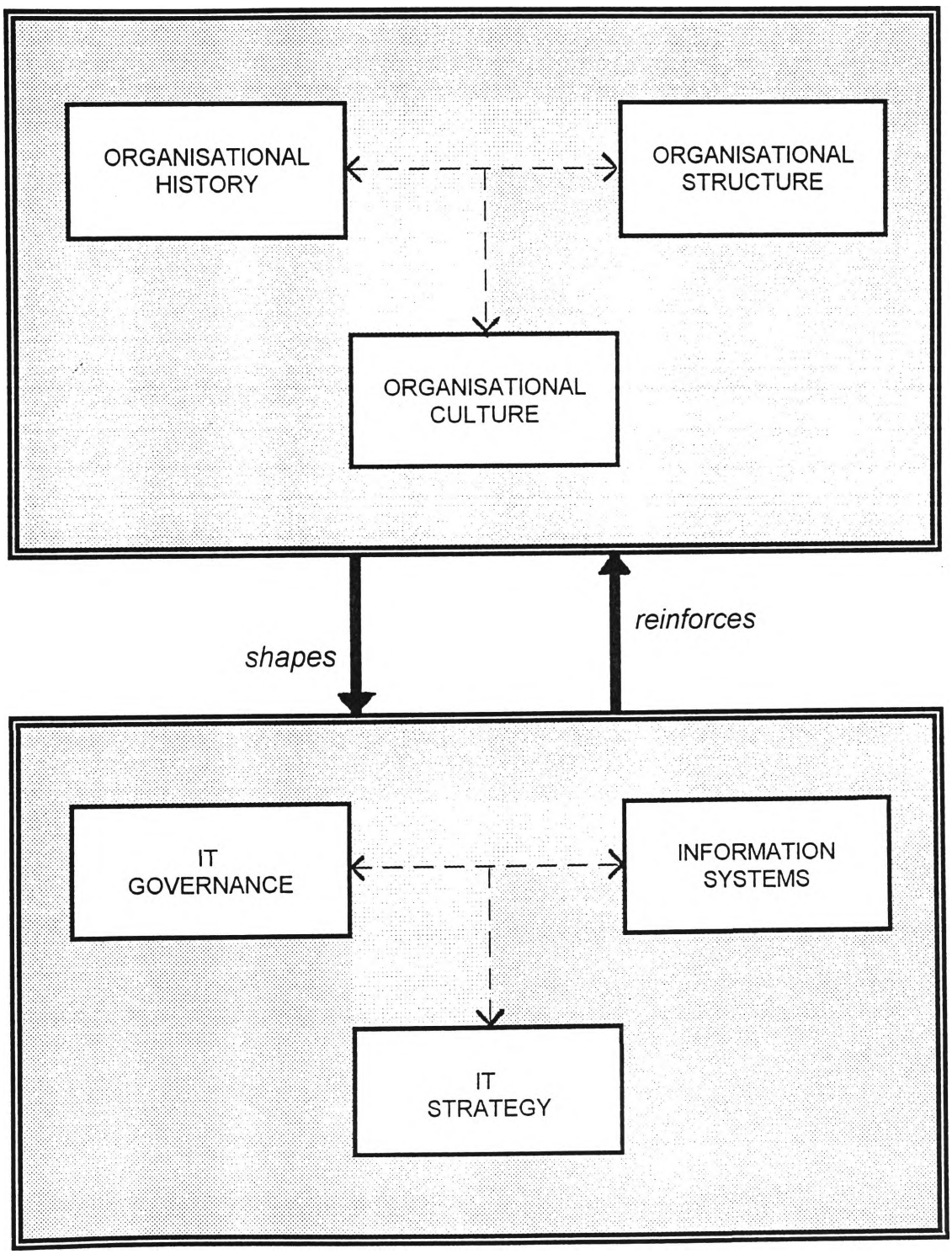
Diagram 2 (below) represents a model which summarises some of the key relationships which have been drawn out in Part 2. It shows that organisational history, structure and culture can mutually influence one another to form a triad, which is capable of strongly influencing or shaping another triad consisting of IT governance, information systems and IT strategy, which in turn can mutually influence one another. This second triad often also acts to reinforce the principles of the organisational culture and structure. It is shown in

Part 3 that these relationships applied within the context of the Organisation.

Diagram 2 is to some extent an idealised model. The relationships shown could in some cases be disrupted by factors external to the model. For example, the leadership of an organisation might impose arbitrary changes to its structure, IT governance, information systems or IT strategy. However as shown in Part 3, such changes may be difficult to impose if they conflict with basic values such as those of the organisational culture.

Part 2 discussed the main theoretical approaches and areas of literature which are required to elucidate the ITSP process in the Organisation. These entail general approaches to strategic planning (rational and processual), anthropological concepts (organisational culture, symbolism and participant observation) and IT governance. The potential relationships among a number of these factors are summarised in Diagram 2. The theoretical approaches and concepts are applied where relevant to the case study in Part 3, and the actual relationships among them are also investigated in this context.

Diagram 2 - Organisational culture and its influences



PART 3

Case study

Part 3 describes and examines the case study, focussing on all aspects necessary to interpret the ITSP process in the Organisation. The theoretical approaches introduced in Part 2 are applied to facilitate understanding. Part 3 discusses in turn the overall research setting, the main research technique (participant observation), organisational culture, cultural symbolism, strategic management planning, internal communication and IT. The treatment of IT examines in turn IT service provision, IT governance, information systems, the IT section, the IT manager and a key earlier IT project. The ITSP process within the Organisation is then analysed further in regard to client/server computing, client/server computing as an Organisation strategy, the further development of the IT strategic plan, and the outcomes of the ITSP process. Part 3 concludes with a critical review of the case study.

At the time of writing, the situation within the Organisation had already started to undergo considerable change, and more was expected to follow. The case study is therefore described in the past tense, even though various aspects of it were still current at the time of writing.

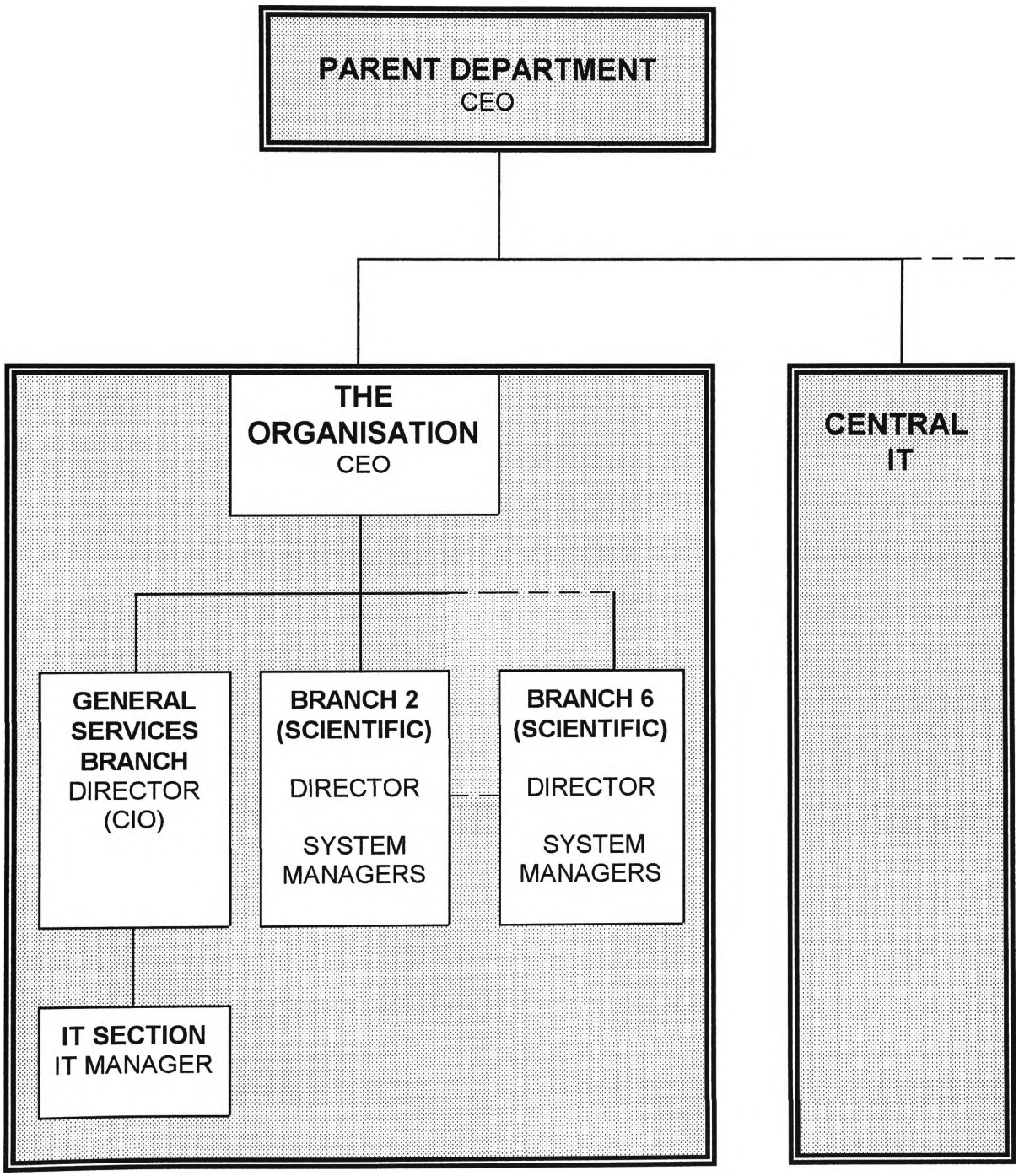
3.1 Research setting - the Organisation

The Organisation was a partly commercialised business unit of a government department (the "parent department"). Although at least one branch of the Organisation could be traced back to the 1920s, the Organisation in the form studied was largely created in the 1960s, with the formation of a scientific body set up to evaluate certain types of products which private companies submitted for approval to sell. This body still existed in the form of a major branch of the Organisation at the time of the study (the "Laboratories" branch). The other four scientific branches of the Organisation had similar histories - two became part of the Organisation in 1989-90, and two joined in 1994-96 (see Diagram 3). All five scientific

branches retained a strong sense of autonomy and individual scientific expertise. As a result there had never been any strong sense of corporate unity among the branches, and there was a generally low level of integration across the Organisation. A sixth branch ("General Services") was established in 1989-90 to provide common services to the Organisation as a whole.

In the terms of the model represented by Diagram 2 (see above), the history of the Organisation influenced its structure to a considerable extent. The history also significantly influenced the organisational culture (as shown later).

Diagram 3 - The Organisation and its structure



The main functions of the Organisation were:

- evaluation and approval of products before their sale;
- testing products already on the market for their safety, effectiveness and adherence to standards;
- investigating reported problems in products on the market; and
- inspecting factories producing goods to ensure that their manufacturing practices were acceptable.

Complementary activities included the monitoring of advertisements for products to ensure they were accurate, overseeing arrangements for the withdrawal of defective products from the market, and providing advice to industry and consumers on regulatory requirements.

The Organisation essentially had a government "monopoly" in all of its functions, and was not subject to any competition in the generally accepted sense. To some extent this led to a perception of the Organisation as being authoritarian by the industry it regulated. Nevertheless the Organisation had a legally binding obligation to carry out its role. The Organisation was also subject to government, political and industry pressures to continually improve its efficiency and effectiveness in its use of public funds, and in the quality of the services it provided to clients.

The main client groups of the Organisation were government, industry and consumers. The industry sector which it regulated paid for a substantial part of the costs of the Organisation, by paying fees for product evaluations and approvals. Consequently there was overt pressure from industry to evaluate products in the shortest possible time. At the same time there were pressures from consumers and consumer groups to ensure the safety and effectiveness of products. The products had the potential to either significantly enhance or (in some cases) endanger the well-being of consumers.

The pressure from government on the Organisation was twofold - to evaluate products in the shortest possible time and at the least cost, while at the same time ensuring as far as possible their safety and effectiveness. These ideals were to some extent conflicting. The conflicting pressures on the Organisation had long been a significant source of tension within the Organisation and industry.

Mintzberg (1994: 194-195) notes that the rational, analytical approach to planning (see section 2.3.1) favours goals which can be readily quantified. Other goals such as product quality and social goals may be harder to quantify, and are therefore less emphasised. The approach of the government conformed to the rational planning model, to the extent that it exerted pressure on the Organisation to continually reduce the time and cost of product evaluations, and monitored and publicised the outcomes.

The Organisation was headed by a Chief Executive Officer (CEO), and each of the six branches was headed by a director. The General Services Branch had responsibility for common services to the whole of the Organisation, including the provision of certain internal IT services by the IT section of the branch. The remaining branches were all more closely aligned with the scientific functions of the Organisation. Each branch was in turn divided into a number of sections (typically about six), each with a section manager. The sections for the most part had discrete, clearly defined functions - many of which were associated with a particular scientific discipline, which often also gave its name to the unit. The evaluation and approval of a product by the Organisation typically involved multiple processes carried out within various branches and sections - some sequentially, some simultaneously. The Organisation had a total of about 500 employees (within the larger parent department), of which about 350 were scientific officers or related technicians. These employees were approximately equally divided among the scientific sections. A significant proportion of the annual budget expenditure of the Organisation was recovered in fees paid by private industry.

Of the 500 employees about 210 were women, or about 42 per cent of the total. Of the scientific and technical staff, about the same proportion were women. For much of the period of the study the Organisation's executive (the CEO plus the directors) consisted entirely of men. However towards the end there were three women as directors (about half). During the study, of the 44 managers of sections and units in the Organisation, eight were women (about 16 per cent). Of the ten information system managers, two were women. It was not possible to obtain official data on the ages of employees or their length of service in the Organisation.

The research setting for the case study was described in this section. The way in which the main research technique of the case study - participant observation - was applied is discussed in the next section.

3.2 Participant observation

The value of participant observation as the main research technique of cultural anthropology (e.g. Spradley 1980) was outlined in section 2.4.3. The case study of the Organisation initially focussed on understanding the approach taken to IT strategic planning, and the background to this. However in order to fully understand this, the study soon required expansion to include the IT governance and information systems, which in turn led on to include the organisational history, structure and culture. The participant observation methods used to achieve this included the observation of processes and events, attendance at meetings wherever possible (both IT-related and other), extensive informal discussions with employees, cultivation of knowledgable key informants who had worked for the Organisation or its predecessors for several years (some up to 20 years or more), and examination of records of meetings, reports of reviews and audits, information system specifications, system user guides, electronic and paper files, memoranda, electronic mail messages and other documents (see "Internal documents").

During the study the researcher had extensive informal discussions with the IT manager, the system managers and other employees at middle management level and below. The field research had only limited access to senior managers. The study was therefore primarily undertaken from the perspective of the system managers and "grass roots" employees in general.

The next two sections apply two key anthropological concepts needed for the interpretation of the case study - organisational culture and cultural symbolism.

3.3 Organisational culture

The concept of organisational culture (e.g. Duncan 1995) and its place in anthropology were discussed in section 2.4.1. The internal culture which prevailed in the Organisation is best described as "scientific autocracy" (this is justified below). A variety of applied scientific disciplines were represented in the Organisation, including both biological and physical sciences. The work of employees was primarily in applied science and technology, and little "pure" science or research was undertaken, although many employees had post-graduate qualifications. However the Organisation regularly published technical reports and occasional papers.

The practitioners of each scientific discipline tended to cluster in discrete, specialised organisational units with professionals of their own kind. This situation had come about over the years largely because scientific managers had typically expanded and consolidated their sections by employing staff members generally within their own disciplines, in order to better support their own responsibilities and interests. New scientific employees had in their turn generally sought specialist positions within their own discipline, with a manager of their own kind - and they freely acknowledged that their careers and professional recognition were best served in this way. Some employees referred to the various groupings as "tribes", with an emphasis on their separateness. There was an acknowledged focus on

individual and small group achievement, as opposed to corporate teamwork. The wider multi-skilling of employees and job rotation were concepts not widely supported within the Organisation.

Within the scientific culture, analytical ability, problem-solving ability and resourcefulness were valued. Formal tertiary qualifications were well regarded and often mandatory, and were frequently included with employees' names on correspondence and business cards (unlike many other public sector organisations). A study within one branch suggested that scientific employees spent on average 25 per cent of their time on professional training and development, whereas other employees averaged 5 per cent. One employee commented, "They look at the letters after your name first, here." The qualifications of other employees were a popular topic of discussion. In their opening remarks in articles and speeches, the Organisation's senior managers and political leaders would often draw attention to their scientific credentials. Membership of professional scientific bodies was valued. The Organisation's library resources also showed a strong leaning towards the scientific disciplines represented in the workplace, at the expense of other areas such as management or IT. The current issues of about 300 scientific journal titles were purchased, but only a few popular computing magazines were held.

The scientific functions of the Organisation were perceived as predominant. As one indication, the floor space available per scientific employee was significantly greater than that for each non-scientific employee. While not directly comparable, in practice this meant that many of the scientific work areas appeared quite spacious, whereas many other areas appeared confined. As another example, in one branch a calendar was publicised showing the anticipated leave of employees - but scientific managers were excluded, with the implication that their availability was not for scrutiny.

Charlesworth et al. (1989) offer an anthropological study of an Australian medical research community, with the aim of understanding how a small group of scientists did their work. These investigators found that not only did the scientific work take place within a specific

social context, but that the context formed and shaped it. The scientific knowledge was not gained by an objective reading of nature, but was "constructed", with the social context of the organisation playing a large part in its construction. The social context formed a distinct sub-culture or "life-world", with its own unique set of shared beliefs, attitudes, assumptions and practices. In this respect the Organisation was similar, in the sense that its context formed a distinct "life-world" based on its applied scientific role.

The scientific culture of the Organisation had been fairly stable for many years. It was capable up to a point of changing and modernising in regard to its technology - but with some important provisos. Because the basic values of the scientific culture were deep-seated and long-established, they were highly resistant to change. This was graphically illustrated by the fact that a fair proportion of the laboratory equipment and technology was largely outdated even by 1989, when the Organisation was established in the form studied. This came about because the technology had tended to move away from "wet" laboratory work (that is, using test tubes, sinks, complex plumbing, etc.) towards increased use of electronic analytical equipment. This trend had been apparent even in the early 1980s, when the laboratories were designed. However, by 1996 the "wet" laboratories still existed and occupied a reasonable portion of the Organisation's building - despite the fact that some were little used, and were described by some employees as "ghost towns". This situation continued in spite of the pressing need of some other sections for more floor space.

Within the scientific units their managers tended to operate in an autocratic manner - rarely consulting others fully, and rarely communicating in any substantial way with other units. However many did communicate quite extensively with their external professional peers. This style of management was generally accepted by employees, because in most cases decisions were believed to be correct, as they were understood to be backed up by scientific expertise, qualifications and experience. Moreover, because there were many different disciplines represented, full communication on scientific matters was often not possible across organisational boundaries. Within the organisational culture it was legitimate to discuss and decide issues within small, expert groups. Larger committees of scientific

"experts" were also used to assist in major decisions, with members drawn from a variety of other organisations including acadaemia and industry. However in most cases these committees were established by legislation or government requirements.

A typical comment by employees concerning another organisational unit was, "They don't know or care about anything else except their own work." One employee remarked that, "When I carry out a [laboratory] test on a sample, I never know where it comes from or where it goes - I'm never given the full picture." In reference to the paucity of communication both across units and between management and staff, some employees in one section commented that they had been "orphaned": "No-one takes any real notice of us or what we do. They might know in general what we are supposed to do, but we hardly see them from one year to the next."

The generally low level of internal communication was frequently also extended to non-scientific matters, and had over time become a feature of the organisational culture. As a result the culture did not highly value internal communication, consultation, participative decision-making, multi-disciplinary teamwork or collaboration. In a few cases the autocratic manner of some managers was only grudgingly accepted, because it was associated with a manner perceived as being arrogant - however this was not widespread. More often, the independent, self-contained presentation of many managers was esteemed and emulated by employees, and seen as being an integral part of a professional scientific approach.

The man who was the CEO for more than five years until 1996 was a former scientist, held in high regard by most employees. For all this time he had presided with apparent satisfaction over the high degree of functional separation within the Organisation, with the tacit approval of most employees. The management style of this CEO was authoritarian and brusque in the style of the scientific organisational culture, and this also was accepted by employees because it was understood to be backed up by expertise and achieved status. The CEO also accepted blunt advice from employees whom he believed to have the necessary expertise to base it on. In describing the way the CEO made decisions on submissions from

subordinates, one employee said, "No one used to give him options - they'd just give him their recommendation. If he liked it, he'd approve it, if not, he wouldn't - and that was the end of it. It didn't matter what anyone else thought. But most often it worked out alright, and most people were happy with what he decided."

The senior executive of the Organisation (that is, the CEO plus the branch directors) was dominated by managers with scientific backgrounds. Only one did not have a scientific background - the General Services director. In 1996 a new director appointed to head one scientific branch had a stronger scientific background than her predecessor, with extensive research and scientific management experience. Although having broader management responsibilities, the senior managers operated substantially in the manner of the scientific managers at lower levels, consistent with the organisational culture. This was expressed in various ways, including the fact that senior managers rarely communicated directly with their full complement of employees, and often only sparingly with those who reported directly to them.

Both the functional disciplinary specialisation and the low level of internal communication were also consistent with the educational experience of many of the scientific staff. Many universities, at least in the period prior to about 1980, had a distinct separation among the various scientific disciplines. There are still marked divisions among some disciplines, particularly between the physical and biological sciences (compare Mayr 1997). Prior to 1980 also, many tertiary science and technology courses then required negligible oral presentation ability, and often only limited written communication skills (personal observation). As one example of the outcomes of this, an employee commented that certain managers would "go to any lengths" to avoid the need to give formal presentations within the Organisation.

An organisation with a scientific culture need not necessarily have poor internal communication. For example, Labovitz and Tanner (1987: 39-41) describe a biotechnology company 15 years old which had retained an entrepreneurial character and which featured

a free flow of information at all levels. The relative youthfulness of the company may have been a factor, along with the "cutting edge" nature of its technology. However there is likely to be no direct relationship between the characteristics of a scientific organisation and the quality of its internal communication - it is likely that each organisation would require investigation on its own terms.

To a large extent the sense of autonomy of the individual branches and many of the sections of the Organisation stemmed from its history. A number of sections reflected their diverse origins as separate scientific organisations in different locations. As a result, there was a general lack of a sense of corporate unity and cohesiveness. This was expressed in several ways, for example, many employees considered that each branch should be separately responsible for its own branch-based strategic planning, including IT strategic planning. Branches often also used their own individual letterheads and logos for correspondence, despite the fact that corporate standards did exist. Many branches had their own individual terminology, and in some cases they had different understandings of the same term. Certainly a sense of shared, collective responsibility for the work and outcomes of the Organisation was not a value of the organisational culture (compare Majchrzak and Wang 1996: 95).

With respect to the model of Diagram 2 (in Part 2), the history of the Organisation had a significant formative influence on both its structure and culture. Equally, the organisational culture, once entrenched, had acted to maintain and reinforce the overall structure.

Hammer (1990) addresses the question of why many organisations have apparently dysfunctional fragmentation in their functions and processes, with work organised as a sequence of separate tasks, with elaborate control mechanisms aimed at making them cooperate. He suggests that such arrangements stem from the Industrial Revolution, when the specialised division of labour was introduced to overcome the inefficiency of cottage industries (Hammer 1990: 107; see also Jones 1995: 1-3). Although this may be broadly true of the present situation in industrialised countries, it does not necessarily explain the

structure of specific organisations. Hammer (1990: 110) goes on to suggest that, "Many of our procedures were not designed at all; they just happened. The company founder one day recognised that he didn't have time to handle a chore, so he delegated it to Smith. Smith improvised...." Again, while this may have happened in some cases, it is not a general explanation, and it also fails to explain just *why* the founder delegated authority, and allowed Smith to improvise at will. In the context of the Organisation, the concept of organisational culture and its influences (see Diagram 2) have greater potential for interpreting the observed situation.

The values of the dominant scientific culture of the Organisation had been largely absorbed over the years by many non-scientific employees who had been exposed to it, even if they had not held such values previously. Such a process of acculturation (or assimilation) is a well-known phenomenon, and has been studied extensively by anthropologists. For example, Evans-Pritchard (1941; 1970: 280) observed that many members of the Nuer group of the Sudan had originally been members of a neighbouring group, but after becoming located in Nuer territory were "converted" to the Nuer culture.

The low level of internal communication also resulted in an organisational culture in which secrecy and selective use of information featured significantly. Information and knowledge were not freely shared, and there was an explicit acknowledgment of the relationship between knowledge and power. In many cases it was openly acknowledged by employees that even apparently inconsequential information would probably not be forthcoming from some managers, because to do so could erode their power bases.

This section applied the anthropological concept of organisational culture - as introduced and discussed in Part 2 - to the context of the case study, to assist understanding. The next section applies the other key anthropological concept needed for the interpretation of the case study - cultural symbolism.

3.4 Organisational cultural symbolism

The way in which certain values of a culture may be condensed into cultural symbols (e.g. Firth 1973) was discussed in section 2.4.2. The scientifically-based culture of the Organisation could be seen as being represented by one particular key symbol which condensed many of its central principles: "the Laboratory". The main Organisation building was designed in the early 1980s as a dedicated laboratory building for the predecessor organisation which became the Laboratories branch of the Organisation. It was completed later at a high cost, and contained extensive laboratory facilities and equipment. The ongoing running costs of the scientific branches were high, for both scientific staff salaries and laboratory equipment and supplies.

Laboratory space dominated the internal layout of the building, occupying over 60 per cent of the working areas. The Organisation was in fact originally called the "....Laboratories", in recognition of its origin in the 1960s as a laboratory-centred body, the similar origin of some other branches prior to 1989, and the continued significant role of laboratories in the functioning of the Organisation. Many employees and others still called the Organisation the "....Laboratories", and this name appeared (incorrectly) on a sign outside the building. The building had a distinctive appearance, and its image was often used prominently in publicity material such as brochures, newsletters and calendars. The fact that the "wet" laboratories still existed after several years and occupied a good portion of the Organisation's building, although their usage had diminished (see above), also underlined the potency of "the Laboratory" as a dominant symbol.

For scientific employees, the symbol of "the Laboratory" often occurred in discourse in a variety of contexts, including conversations, chance remarks, documents, messages and newsletters. From these sources, it was apparent that the symbol had connotations for many employees which included the following:

(a1) the tangible, physical building with its high quality, expensive scientific facilities, equipment and resources;

(a2) productivity and efficiency, exemplified by the perceived professional scientific approach of the Organisation;

(a3) the perceived high value of the Organisation's applied scientific work to the community, exemplified by the high ongoing costs needed to ensure the safety of the products for the public;

(a4) a sense of the distinctiveness of the Organisation as an instrument of government - of being separate and different from most other public sector organisations;

(b1) a general sense of pride in successful applied scientific work and technological achievement;

(b2) the broader scientific method and experimental approach, with their associated precision, rigour, objectivity and search for explanation and understanding;

(b3) the possession and generation of arcane scientific knowledge - which was not widely understood or its significance fully appreciated by laypersons; and

(b4) the potential for scientific creativity, talent and insight to advance and benefit humankind in general.

A dominant symbol may have a range of referents which fall into two main classes: those which refer to aspects of the social order, social categories and values (the "normative"), and those which have physiological associations and which appeal to the emotions and desires of members of the culture (the "orectic") (Turner 1967; 1987: 174-175). In the case of the Organisation, the dominant symbol of "the Laboratory" had connotations (a1) to (a4) (see above) which related in broad terms to the instrumental function of the Organisation and its important role within the wider society, and connotations (b1) to (b4) which generally elicited positive and favourable emotions related to the nature of the work. Taken together, the two classes of referents of the symbol "the Laboratory" acted together to reinforce the organisational cultural principles they represented.

In terms of physiological associations, the laboratory work was sometimes referred to as the "heart" of the Organisation. This was occasionally accompanied by some disparagement of the document-based evaluation of other areas, or "paperwork" - although it was acknowledged that this was also essential. Also, the complex network of expensive, special purpose plumbing and cabling which delivered various fluids and services was sometimes referred to as being the "life blood" of the laboratories. However probably more significant in terms of physiological referents, there was a distinct recognition that the accurate assessment of products by the Organisation could in some cases have "life or death" consequences. For example, a political leader commented in a speech on the importance of the proper scrutiny of products which have the potential to "save lives when used well and to take lives when not" (1997).

In regard to the emotions elicited by the symbol, an internal Organisation staff newsletter offered reinforcement of the favourable view of science taken by many employees: the prominent scientific author Richard Dawkins was quoted approvingly as saying in a press interview:

> "[Science] is like music or great art. It is an experience in its own right, in competition with religion and seeking to answer the same questions. What I do best is promote an understanding of the poetry of science...." (Organisation newsletter 1996)

In a similar vein, a political leader of the Organisation said in a (written) speech:

> ".... I believe there is no essential difference between artistic creativity and scientific creativity.... Many people look at Michelangelo's David, Mozart's music or Shakespeare's plays for inspiration. I look to Rutherford, Loewi, Einstein, Crick and Watson for my inspiration.... to me, the great essence of science, that takes it beyond art or literature, is its capacity to improve humanity.... No doubt in the future, scientific talent, creativity and insight will continue to better humankind."(1996)

However there appeared to be little overt recognition within the Organisation that the need for scientific insight on some issues affecting humankind (such as nuclear waste and environmental pollution) actually stemmed from earlier misuses of science or technology.

This section identified and discussed a key symbol of the Organisation - "the Laboratory". By applying the theoretical approach outlined in Part 2, it was shown that this symbol condensed and reinforced significant values of the scientific culture. More generally, the structure and internal culture of the Organisation were described and analysed in the sections above, to set the scene for the following discussion of the approach taken to strategic planning.

3.5 Organisation strategic management planning

The relevant theoretical approaches and literature relating to strategic management and strategic planning were discussed in Part 2 (sections 2.1 and 2.3). This section introduces the "official" approach to strategic planning taken by the Organisation, applying the theory as appropriate - primarily in terms of the rational model of strategic planning (e.g. Ansoff 1990; see section 2.3.1).

The Organisation produced its first corporate "strategic management plan" in 1994 (and no further such plan had been produced at the time of study). The key factors which led to this plan included a government review in 1991 which recommended that the Organisation develop such a plan, and government pressure for greater efficiency and effectiveness. A rising level of general awareness in business and government of strategic planning and its perceived worth also contributed, as illustrated by an increasing number of management consultancies which offered strategic planning services.

The strategic management plan was produced by external consultants in accordance with the rational model. The plan stated that the CEO was "responsible for strategy development

but is dependent on a consultative process to ensure communication across [the Organisation]. There is a need to use the skill, experience and expertise of all persons who can contribute to the formulation of new policies and procedures....." Within the public sector over previous years there had been a considerable amount of rhetoric about the value of consultation and employee participation (generally under the banner of "industrial democracy"), and these were key elements in the strategic plan. The plan proclaimed that:

> "The branch directors' meetings.... will include strategic planning through including agenda items and position papers coming from the CEO.... Consultative processes will be developed to ensure that all staff participate in the discussions related to future planning and policy decisions. This will take place from a bottom-up approach.... The discussions and decisions taken at branch directors' meetings will be openly available to all members of staff and will be discussed downwards to branches and sections following branch directors' meetings" (Organisation strategic management plan 1994).

There was also a joint Organisation-union consultative forum, in which senior management and union and professional association delegates met quarterly to discuss major issues. The strategic management plan noted that this would "not displace the major consultative process which will have the bottom-up approach and complementary consultation process".

Following on from the corporate "strategic management plan", in 1995-96 the Organisation undertook to prepare more detailed operational business plans for each branch, on an individual basis. The approach taken to developing these fell squarely within the rational school. In at least one branch, "key result areas" were set by its director, together with goals, performance targets and strategies designed to meet them. Armed with proformas containing these predefined details, each section was then asked to identify - but only for each strategy relevant to it - sets of activities, outcomes, resources and timeframes which would address that strategy. Little opportunity was provided for employees to comment on or alter the predefined framework. The information provided by the sections then flowed upwards to the director, where it was collated into the branch plan. At this point the information was severely abridged and reduced to only a few key activities per strategy -

thereby losing much of the finer detail which had been provided by the sections. The intention had been to collate the branch plans into an Organisation-wide business plan. However in practice less than half the branches actually developed business plans, and no corporate business plan was produced.

At that stage no attempt was made to integrate ITSP into the strategic planning process. The publicly declared strategic management principles of the Organisation, as expressed in its strategic management plan were outlined in this section, and identified as falling within the rational model of strategic planning. The next section addresses the extent to which some of these proclaimed principles were reflected in practice in the Organisation.

3.6 Internal communication

Despite the generally positive tone and consultative rhetoric of the "rational" 1994 strategic management plan, the reality was quite different, and this is discussed below. The strategic plan had identified as significant weaknesses a lack of co-ordination and poor communication among the branches:

> "[The Organisation] must work as a whole.... Cultural and organisational change... must also allow for co-operation and communication between the branches and sections.... Opportunities for co-operation and teamwork must be identified wherever possible" (Organisation strategic management plan 1994).

The plan had never been well accepted within the Organisation, and its existence was not even widely known about. In part this was due to the fact that it had been prepared in a top-down fashion by external consultants, and there was little sense of ownership by employees. There was also little management commitment to the plan, and in particular to its integrative aspects - despite the fact that senior management had initiated the planning process. However to a large extent it was also due to the fact that the plan promoted values which were not generally recognised as being applicable within the culture of the Organisation - namely consultation and cooperation - and which were therefore passively resisted.

In practice, the CEO did meet formally with the directors of the various branches at approximately fortnightly meetings, at which management decisions were made. Shortly after the meeting each branch director usually met with the section managers of his or her branch, primarily to verbally pass on relevant information. Soon after this each section manager was expected to meet with his or her staff for the same purpose - however this tended to occur much less frequently.

At the various meetings below branch director level there was some limited scope for employees to comment on decisions made at higher levels, but there was no formal process of capturing these suggestions and feeding them up the hierarchy. There were normally no staff meetings held just prior to either branch directors' or section managers' meetings, and staff were rarely asked for their timely input on any significant issues. Many employees had never seen any branch directors' meeting minutes. On the infrequent occasions when the views of employees were sought (such as during the IT strategic planning process - discussed below), they responded only very sparingly, partly because they were unaccustomed to being consulted in a meaningful way.

The minutes of branch directors' meetings were available to selected employees in the form of electronic copies on a computer network server. However these were not publicised, and access was controlled and difficult to obtain. In any event, the minutes were highly abridged and "sanitised" versions of events, and actually documented little more than some major decisions, after the event.

Shared space on servers on computer networks was available for the use of sections, but this space was divided up according to the structure of branches and sections, with each section normally able to access only its "own" information. That is, little advantage was taken of the potential of IT to enable and facilitate the wider sharing and dissemination of information.

The CEO for his part never verbally addressed employees as a whole, or even a significant subset of employees, and communicated to all staff in writing only twice in a twelve month period. On one of these occasions he castigated employees for providing poor client service, on another he announced the appointment of a new director, applauding her strong scientific background. In some contrast, the CEO of the parent department had on at least six occasions in the same period personally sent messages to all departmental staff, and addressed several public gatherings to which all staff were invited, and which many attended. During the course of the study, an unsuccessful attempt was made by a key manager in the Organisation (the IT manager) to limit electronic access by staff to information originating from the parent department, on the grounds that it was inefficient to maintain full access.

When it did occur, communication from management to staff in the Organisation was often expressed in an authoritarian manner. As an example, an instruction issued by a scientific branch director to all Organisation staff read in part:

> "An officer preparing correspondence must personally prepare the addressed envelope .... Before the letter is sent, a second officer must confirm personally that the letter is correctly addressed by checking the letter against other documents on the relevant departmental file, confirm personally that the envelope is correctly addressed, and sign in full and date the file copy as a record that the above have been undertaken.
>
> "Prohibited Activities: Existing databases must not under any circumstances be used as the source of address for outwards mail ...." (Instruction to staff 1996)

Besides being patronising in tone, this also reflected the fact that many of the Organisation's databases contained unreliable data (this is discussed further below).

There was also a paucity of effective communication among organisational units. For example, an internal audit of the Organisation undertaken by the parent department in 1996 included such comments as:

> "Staff often understand very little of the business of other areas and thus don't have common ground for discussion....
>
> "There is currently no mechanism to alert one area of [the Organisation] to action taking place in another with respect to a manufacturer or product, for example, that a product has been publicly recalled or is under surveillance. There have been cases where action by one branch has proved embarrassing to [the Organisation] because of action being undertaken at the same time by another branch." (Audit report 1996)

The realities of the poor internal communication within the Organisation were discussed in this section. The following sections address in detail the application of information technology in the Organisation.

3.7 Information technology

Section 3.7 and its sub-sections address in detail the ways in which IT was perceived and applied in practice in the Organisation, covering the areas of IT service provision, IT governance, information systems, the IT section, the IT manager, a key earlier IT project initiated by the IT manager (the Linkages project) and IT strategic planning. IT strategic planning is then discussed in greater detail in terms of client/server computing (both in general and as an Organisation strategy promoted by the IT manager), the further development of the ITSP and the outcomes of the ITSP process. The theoretical approaches and literature introduced in Part 2 are applied where relevant in section 3.7, namely approaches to strategic planning (both rational and processual), organisational culture and IT governance.

3.7.1 Information technology service provision

There was a separation of responsibilities for the provision of IT services and related functions between the Organisation and its parent department. The Central IT division of the parent department (see Diagram 3) had primary responsibility for most phases of the Organisation's major mainframe-based application systems, including most aspects of their

analysis, design, development, implementation and maintenance. The "system managers" of the Organisation, although described as such, for the most part were responsible only for the user design, administration and operation of information systems - although the actual level of responsibility varied considerably among individuals. Supported by the IT policies of the parent department, Central IT effectively had a monopoly on the provision of most IT services to the Organisation, and there were no real alternatives available. Central IT also had primary responsibility for the provision to the Organisation of IT infrastructure (including midrange servers, personal computers, local area networks and telecommunications), desktop computing services (including word processing, electronic mail and spreadsheets), and "help desk" services. Central IT and its mainframe were located several kilometres away from the Organisation, and were connected to it by telecommunications links.

These responsibilities were documented in a service agreement between Central IT and the Organisation, which defined the services which Central IT should provide to the Organisation, the criteria for the services (including response times) and the charges which the Organisation had to pay. The service agreement was reviewed annually on the Organisation's behalf by the IT manager, although it was the Organisation's Chief Information Officer (CIO) who signed it. The service agreement was the basis of some conflict between the Organisation and Central IT, revolving around perceptions by some within the Organisation of poor service provision and overcharging by Central IT.

The monopolistic provision of IT services had led to a reliance by the Organisation on Central IT to manage many aspects of the Organisation's IT, in a manner which went beyond that of a typical commercial service provider. Some examples of this follow. Although in principle the branches of the Organisation specified the business requirements for their systems and Central IT responded with technical solutions, in fact Central IT also had significant involvement in interpreting the business requirements. This was partly due to the fact that Central IT possessed formal business analysis skills whereas the Organisation did not, and partly due to a lack of IT sophistication on the part of the Organisation. The

resources and time needed for individual IT projects and tasks were estimated and allocated by Central IT, largely outside the Organisation's control. The testing of systems was largely undertaken by Central IT, in the absence of rigorous acceptance testing by the Organisation. When a fault was detected in a system, the relevant branch of the Organisation would usually refer it directly to Central IT, with little attempt to analyse its implications first.

Central IT also controlled most aspects of the Organisation's desktop computing, and exercised their rights in a manner seen as arbitrary by some within the Organisation. This caused some friction, for example, when software upgrades were issued by Central IT to all desktop platforms using an automatic process, all PC software which was not deemed "approved" was culled, including some software supplied legitimately by other public sector organisations.

In regard to service provision, an audit of the Organisation undertaken by the parent department included some revealing comments:

> "An issue of great concern within [the Organisation] is the perceived poor service provided by [Central IT]. They cite a history of projects which have not delivered what was required, which were significantly over time and over budget, [or] which were developed with unsuitable technology.... Staff from [Central IT] believe, on the other hand, that [Organisation] staff are not prepared to contribute sufficient resources to understanding and specifying their business requirements, to conducting thorough testing and to maintaining the systems once they are in operation...." (Audit report 1996)

The nett effect was that the role of Central IT was paternalistic, and the role of the Organisation one of relative dependence. Central IT was always there to "patch up" a problem in some way, even if the solution was expensive, not ideal or not in the Organisation's long-term interests. There was some resentment of Central IT's paternalistic and sometimes authoritarian manner, which was however at least partially created by the Organisation's own attitude of dependence.

The provision of IT services to the Organisation was outlined in this section, including the paternalistic role of the main IT service provider. The way in which IT was governed in the Organisation is addressed in the next section.

3.7.2 Information technology governance

The concepts of IT governance, organisational culture, emergent strategy and the processual school of strategy formation were introduced and discussed in Part 2. These are applied as necessary in this section to clarify the way in which IT was governed in the Organisation.

The Organisation's style of IT governance was largely implicit and undocumented (e.g. Shipley 1995; section 2.5). Much of the IT governance framework emerged from the backdrop of the organisational structure and organisational culture (e.g. Duncan 1995; section 2.4.1), fitted well within both, and reinforced their tenets. Over the years, the Organisation's dependence on Central IT had held it back in terms of IT. It had not been conducive to any critical examination of the IT environment, to the development of a mature approach to IT, nor to the acquisition of highly qualified IT personnel. The last applied to many of the system managers. Nevertheless most of these employees had substantial practical expertise within their particular areas of responsibility, based mainly on local experience. However within the Organisation, IT in general lacked the status and prestige accorded to the scientific disciplines. Some of the system managers also had scientific roles or backgrounds, while many worked with or were supervised by scientists. IT was seen as a basic infrastructure necessary to support the "real" scientific business of the Organisation, but not an integral part of it. For example, some Organisation publicity material referred to the "professional staff" which it employed, but listed only scientific disciplines. In this material IT did not even rate a mention under the categories of "support staff" which were also listed.

The CEO was essentially ineffective in terms of IT, accepting no explicit IT role or responsibilities, and having little knowledge or background in IT. The director of General Services branch had certain overall IT responsibilities, and was in effect the CIO. However he in turn had no extensive knowledge of IT, and by default many IT responsibilities were delegated to his subordinate, the IT manager. Both the CEO and the CIO had a fairly simplistic perception of IT as being simply a necessary supporting infrastructure which required close attention to costs - somewhat akin to telephone services. Neither had a strong conception of IT's potential role in supporting, enabling or creating business strategy (for example, as noted by Henderson and Venkatraman 1993). The IT manager headed a small IT section (in General Services branch) which had responsibility for coordinating and to some extent managing the provision of common IT services and facilities within the Organisation.

An IT steering committee in the Organisation consisting of senior managers oversighted all IT activities and projects. The CIO chaired this committee, but it was largely irrelevant and ineffective in terms of considering IT policies or strategies, or making decisions of any real consequence. The CIO was seen as irretrievably aligned with his General Services branch, which moreover did not have the organisational status of the other branches as it was not scientifically based. The steering committee was therefore seen as aligned with one branch only, and not a significant one at that. The committee also had no formal charter or responsibilities, no well-defined membership, and no fixed meeting schedule. It met essentially on an ad hoc basis, and when it did meet, formal minutes were rarely produced. Also when it met, the scientific branch directors often sent varying numbers of their section managers or system managers to represent them. The directors themselves had little interest in or knowledge of IT. Certainly, they had no real commitment to the integration of information systems across branches. One employee described his branch director's attitude to IT as entailing, "You just tell [Central IT] what you need, and they do it - it's their problem." As such the steering committee often became a forum for arguments among system managers, which frequently went unresolved. As an illustration of the lack of decisiveness of the steering committee, the IT manager could later claim that the committee

had supported a significant IT project ("Linkages" - see section 3.7.6 below), whereas some system managers could claim the committee had discontinued it.

Most significant decisions on information systems were made independently by the Organisation's branches, including their initial planning, user design, administration, operation, and the need for maintenance and review. Each of the six branches had its own IT staff to represent its interests, generally including one or more system managers and one or more "owner managers". Each of the ten system managers had certain technically-oriented responsibilities for one or more of the 22 key application systems, and each of the twelve "owner managers" had certain business-oriented responsibilities for one or more systems. Despite their title, the owner managers had mainly operational responsibilities, such as ensuring the regular update of data and generating reports. However neither the system managers nor the owner managers had clearly defined roles, and there was considerable overlap among their responsibilities and differences among branches. Many of these positions were part-time as regards systems work, varying from around ten to ninety per cent. The system managers in general were considerably more influential in terms of systems than the owner managers.

These staff positions were mainly focussed on IT issues relevant to their "own" areas - there was little Organisation-wide focus. A typical comment by employees was: "What do we need a [corporate] IT section for anyway? We each do our own." The power of the branches on IT matters pertaining to their individual areas was vested mainly in the system managers. This gave the system managers considerable influence over IT matters within their respective areas, and collectively, over much of the Organisation's use of IT. The system managers constituted the vital core of the implicit IT governance framework. In terms of the model of Diagram 2 (in Part 2), the structure and culture of the Organisation significantly influenced the perceptions of the system managers and hence the IT governance. This in turn reinforced the principles of the organisational structure and culture.

The system managers did form a loose-knit network, which occasionally met to discuss broader IT issues. However this network had no formal role or charter. The network was coordinated by the IT manager, but in the twelve month period of 1995-96 it met as a full group only about four times. This was largely deliberate on the part of the IT manager, who chose not to risk encouraging the development of a more cohesive, potentially more powerful group. He commented, "If I let them get together too often they only gang up on me." This reflected both his apprehension that the system managers may collectively oppose his decisions, and also an awareness that they would only be likely to collaborate effectively across branch boundaries if they were brought together by some external means. Nevertheless within the IT governance framework, it was legitimate to discuss and even decide issues within small technical groups. This was in keeping with the wider organisational culture, in which it was acceptable for scientific decisions to be made within small, expert groups. It was therefore reasonably common for two or three system managers to meet with the aim of resolving a joint issue, although usually this only occurred within one branch. However such meetings often failed to achieve full resolution of the issues.

The service agreement between the Organisation and Central IT (see section 3.7.1) was one of the few explicit signposts within the IT governance framework. However it was silent as regards which areas within the Organisation were the actual clients of Central IT, leaving the way open for the individual branches of the Organisation to arrange directly with Central IT to develop and maintain their information systems on a largely independent basis. For example, the service agreement did not identify the IT manager as the primary point of contact in the Organisation. Central IT did follow a broad system development methodology based on software engineering principles, but this also was silent in terms of defining clear roles and responsibilities for the various activities.

In this respect, the Organisation's structure and culture filled the void, by moulding the implicit aspects of the IT governance framework, including the control over information systems which formed its most important part. These were in fact emergent strategies, in

Mintzberg's terms (e.g. Mintzberg and Waters 1985). They did not stem from any particular initiative or action within the organisation, but were shaped by the dominant organisational culture. The IT governance fell within the broad approach of the processual school of strategy formation (e.g. Mintzberg 1978, 1994; see section 2.3.2), to the extent that it emerged from the foundation of the Organisation's cultural values and processes. In regard to the model of Diagram 2 (in Part 2), the organisational culture and structure largely shaped the IT governance.

Mintzberg (1994: 412-413) notes that organisations which in effect have strong internal cultures tend to reject formal strategic planning, but rather rely for overall coordination on the application of cultural norms. The experience of the Organisation supports this view. Mintzberg also notes that organisations sometimes complement their emergent strategies by pursuing "umbrella" strategies, with the broad outlines being deliberate while the details are allowed to emerge (1994: 209-210). At least in terms of control over information systems, it could be said that the Organisation pursued no formal, documented IS strategy at all, but left it entirely to emerge from lower-level understandings and decisions.

The style of IT governance operating within the Organisation was described in this section. The next section discusses in more detail the nature of the information systems of the Organisation.

3.7.3 Information systems

In the context of this thesis, information systems are seen as a major subset of the broader span of IT within the Organisation. This section focusses on their nature, applying where relevant the theoretical concepts of organisational culture and emergent strategy (as discussed in Part 2) to their interpretation. The term "information system" denotes a computer-based system, its set of users (including those who enter data and those who access information) and their associated manual processes. For convenience, "information

system" in this thesis is often used to refer mainly to the computer system component - but the wider context is also implied.

The Organisation's IT was seen by many employees as being merely a "support activity" (Earl 1989: 5-6), with low strategic impact and only occasionally requiring senior management attention. Many of the information systems were "Type 1" legacy systems in the terms of Lo (1991), that is, they resulted mainly from the simplistic automation of pre-existing clerical and administrative procedures within the respective branches and units (Remenyi 1996: 84). In many cases this had come about from a combination of failure to fully analyse business needs, and delegation of the task of specifying system requirements to local operational staff, who often saw no real alternative to the existing work practices.

Many of the systems, although simple in conception, were themselves reasonably large and complex, with a typical size of around 50 to 80 thousand lines of code, with around 1000 to 1500 function points. Most of the systems were developed using a proprietary mainframe-based non-relational database management system, which was not conducive to extensive integration among the different application systems, nor to the production of higher-level management information. Many of the systems also were not seen as being "user friendly", were difficult to understand, use and modify, and had a high cost of maintenance.

Each system provided little in the way of meaningful management information - even relevant to its own organisational unit, let alone higher levels of information across units. There were only a few systems which approached being "Type 2" in the terms of Lo (1991), that is, more sophisticated systems which could provide assistance with non-routine policy tasks, and which could provide meaningful management information, both within and across organisational boundaries. Similarly the systems had not been designed to support enterprise integration (e.g. Janet 1996), and no real attempt had ever been made to achieve this.

The information systems had been developed largely as separate "islands of automation" in each of the branches and even in many sections, with little overall integration or commonality. In some cases this had come about when a predecessor of the Organisation developed a system independently, but most systems were developed after the Organisation was formed as such in 1989. Subsequently the systems had evolved separately in response to the emerging needs of individual branches and changing legislation.

Even though most of the Organisation's corporate systems were developed and maintained by Central IT division, they were still largely independent. That is, Central IT had responded individually to the business requirements of the different organisational units. Although superficially many systems had similar user interfaces, many of their basic conceptual schemas differed (Nijssen and Halpin 1989), and so many of their interpretations of data and database structures differed. As a result, intercommunication among the systems was difficult. This situation stemmed largely from a failure to identify key categories of common corporate data, and to establish policies to manage them effectively. For example, an audit undertaken by the parent department commented on the "lack of a corporate data model and identification of key data, its characteristics and appropriate 'owner'" (Audit report 1996). In any case, it would have been difficult to develop a meaningful corporate data model, given the fragmentation of database structures and related responsibilities.

The desktop software environment was reasonably standard as it was provided and supported by Central IT, but even in this respect the Organisation had chosen to use a different configuration of servers from the parent department. Some sections of the Organisation also elected to use non-standard, unsupported packages including word processors, spreadsheets and database management. It was also reasonably common for users in the Organisation to alter, or attempt to alter the standard configuration of equipment supported by Central IT.

Little attention was paid to the quality of many of the systems as they were developed. A complete software quality management system was available to both Central IT and the

Organisation, but had lain dormant for years, following an earlier decision by Central IT that quality assurance was the responsibility of user areas. As a result there was no formal quality management, and few thorough reviews of system components were undertaken as they were developed. Consequently there were fundamental defects in many systems, as illustrated by comments from an audit of one system:

> ".... errors in the operation of the database.... In some cases standard reports are known to be consistently inaccurate.... There are some problems with unreliable and inflexible reporting and with data integrity. In addition the system is complex and not user friendly which impairs its usefulness. There is no user documentation or system training and this contributes to the difficulties of using the system effectively... Data was loaded on to the new system without being fully checked..." (Audit report 1996)

There was also a multiplicity of smaller systems within many branches, developed independently to meet the needs of specific organisational units. These were based on a variety of commercial packages, including database management systems, spreadsheets and scientific software packages. The Organisation's IT manager and the official system managers generally had little knowledge of or influence over these systems. While the smaller systems were nominally "independent" in that they did not have automated links to any other systems, many of them replicated processes performed elsewhere or data held elsewhere.

In some cases the smaller systems reflected the fact that many scientists in general have long been closely involved in the development of their own systems. For example, in the 1970s scientists typically had a comparable level of programming ability to computing staff in scientific languages such as Fortran, and often wrote their own programs (personal observation). This attitude persisted in some scientific areas of the Organisation, and was reflected in a fairly high level of end-user systems development (compare Lo 1991: 34).

The evaluation and approval by the Organisation of a product submitted by a private company typically involved multiple procedures carried out by various branches, sections

and systems - some in sequence and some in parallel. When procedures or workflows crossed from one information system to another, data often had to be re-entered in different formats and with different meanings - all of which was time-consuming, error-prone and inefficient. For example, after evaluation, the details of all approved products were recorded in a register, which was partly computer-based and partly paper-based. The employees of the section which maintained the register usually had to enter many of the details afresh, even though the product had earlier been recorded in various systems. A single product as recorded in one system could be treated by other systems as a varying number of different products with an assortment of names. Moreover when the data in one system was subsequently updated, other areas might not be aware of the change, resulting in their systems containing inaccurate data.

The lack of corporate integration among information systems was reflected in an audit report, which included comments such as:

> "Since 1987 there has been little success in developing integrated systems and data structures in [the Organisation]. Instead, separate systems have been developed on an ad hoc basis, with attempts made after the event to co-ordinate at a fairly low level. Most areas appear to have developed their own databases to hold information which is relevant to their specific work interests...." (Audit report 1996)

The Organisation also had a multiplicity of "sub-registries" for holding paper files and records, generally following the structure of branches and sections. The data held in many systems was supported extensively by paperwork, largely as a result of deficiencies in the text handling capability of the systems. Information was frequently duplicated across the largely independent holdings, and such information was often also inconsistent. When it was necessary to uncover all known information on a certain product, it was common to find separate records in systems and paper files in many different areas, with no central register and little accurate cross referencing. One employee commented, "If someone rings up and wants to know everything about a particular product, I have to go around all the branches and sections one by one, asking each one of them if they have anything on it. It's not

unusual to find up to 20 files or so with some information on the same thing." Moreover control over file movements was poor, and during the study messages asking for assistance in locating missing files were broadcast to all employees on about a fortnightly basis.

The various branches and sections were described by some employees as "stovepipes", implying that their functions were largely independent. One employee commented that "The work we do isn't connected very much to anyone else's - after we finish it just goes up in smoke." This was parallelled by the fact that, looking from an external perspective, the Organisation as a whole had been described as a "stovepipe" of the parent department, by its CEO (Departmental report 1996).

The separate systems and processes were deeply entrenched, and one employee commented, "They're so bedded down now that it'd be almost impossible to change them." The audit report commented that the situation "may also be a reflection of a cultural situation which needs addressing...." (Audit report 1996). This was one of the few instances in which it was recognised that cultural factors were significant organisational issues - but the report offered no suggestions for addressing them.

Essentially the nature of the Organisation's information systems and related procedures constituted an unformalised, emergent strategy (e.g. Mintzberg 1994: 25, as discussed in section 2.3.2) - that is, an overall strategy did exist but it had not been expressly intended or planned as such. The process by which the strategy came to be widely adopted within the Organisation (in the absence of any formal strategy being promulgated by management) was related to the informal sharing and learning of values within the organisational culture, among its members (as discussed in section 2.4.1). In terms of the model presented in Diagram 2 (in Part 2), the Organisation's culture and structure significantly shaped the nature of the information systems and the implicit IT strategy. These in turn reinforced the precepts of the organisational culture and structure.

The nature of the information systems of the Organisation was analysed in this section. The key role of the Organisation's IT section is outlined below.

3.7.4 Information technology section

The General Services branch had particular responsibilities for IT, but these were effectively delegated mainly to its IT section. The main responsibility for the coordination and overall management of IT in the Organisation (to the extent this was achieved) fell to this section and its manager. The objective of the IT section was to ensure that the Organisation's overall IT aim was achieved. It attempted to meet this largely by coordinating and monitoring the provision of services by Central IT under the service agreement.

The overall aim of the IT function within the Organisation was stated in 1995 as "to support the cost-effective achievement of the strategic goals and objectives of the [Organisation] and its components by the ingenious and intelligent application of information technology" (IT section role statement). In terms of supporting the achievement of the goals of the organisational units - as understood by them on an individual basis - the IT function had been relatively successful. That is, the units in fact had their systems, although they also perceived many deficiencies in them. However in terms of supporting the achievement of corporate goals, the IT function had been largely unsuccessful. For example, it provided little support for the corporate teamwork and coordination called for by the strategic management plan of 1994 (see section 3.6). In terms of the "ingenious and intelligent" application of IT, the IT function was also unsuccessful, as judged by the preponderance of unsophisticated Type 1 systems over Type 2 (see section 3.7.3).

The IT section's most significant player was its IT manager, and the role of this key individual is examined further below.

3.7.5 Information technology manager

This section focusses on the critical role, management style and practice of the IT manager. The theoretical concepts of organisational culture and IT governance (as discussed in Part 2) are drawn on to assist in explication.

Since the amalgamation of bodies in 1989 to create the Organisation in the form studied, the role of the IT section and its IT manager (or earlier, "IT coordinator") had been restricted largely to relatively mundane responsibilities such as monitoring the IT service agreement, IT asset management, desktop computing, telephone services and limited coordination of work on the Organisation's information systems (maintenance, enhancement and some development), within the terms of the service agreement with Central IT.

The role of the IT section was broadly technological, but it could not accurately be described as "applied scientific" in the way the scientific units of the Organisation could be so described. The IT manager at the time of study had been appointed in 1994 by the CIO. The CIO had little understanding of IT (as noted above), and was said by some employees to have "cloned" the IT manager in his own likeness. The IT manager also had little professional experience in IT, but did have earlier experience as a system manager and user within the Organisation. The reason for the CIO's decision lay at least partly in the fact that since most IT services were provided by Central IT as a virtual monopoly, there was little incentive to seek substantial IT experience, and more incentive to seek demonstrated local knowledge of the Organisation's information systems. The decision was also consistent with the implicit IT governance (e.g. Shipley 1995; section 2.5) and the organisational culture (e.g. Duncan 1995; section 2.4.1) - in terms of the influence of branches and their systems (as discussed in section 3.7.2).

The new IT manager soon displayed a distinctly "technologically autocratic", or "technocratic" style apparently modelled on the scientific autocracy of the prevailing

organisational culture, based on his previous immersion in it within the Organisation. He had been personally exposed to autocratic scientific managers, and as a consequence had evidently adopted their general attitude and style. An example of his technocratic style is given below in relation to a stores inventory system. Further examples are described later, such as in the context of the Linkages project (see section 3.7.6) and the IT strategic planning process (see section 3.7.7).

In the normal course of events a new manager's successful assimilation of the prevailing cultural values would be a beneficial strategy, whether deliberate or unconscious, and would result in greater acceptance of the manager by the members of the culture. The autocratic style in general was accepted from scientific managers within the Organisation, and was in most cases supported by known competence and experience. However the IT manager's style was not generally acknowledged as being backed up by substantial IT experience or qualifications. His style also included selective release and withholding of key information and knowledge, again a trait generally in keeping with the organisational culture. The fact that a large part of the IT governance framework was implicit also often worked to his advantage. For example, when a branch's decision supported his strategic objective (such as a decision to redevelop a system in a client/server form) he would publicise it, but he would withhold contrary decisions made by other branches (see below).

Initially the IT manager's technocratic style was applied mainly to fairly low-level IT decisions, which although they upset many, did not have major consequences for the Organisation as a whole. For example, in 1994 he personally selected an information system designed to manage the inventory of stores, based on a commercial PC package. He made this decision without consulting most of the key stakeholders and users. His main motive was to enable the Organisation to move its stores system away from the parent department's mainframe, and potentially make significant cost savings. The new system was installed, but did not meet the actual needs of the users. Among other things, it required customisation and lacked a necessary multi-user capability. The outcome was that the system was never used, and an ongoing legacy of mutual mistrust was established between the parties

involved.

The general style of the key IT player in the Organisation - the IT manager - was discussed in this section. Some of his most significant earlier decisions and actions are examined in the next section.

3.7.6 System linkages project

This section describes and analyses a key earlier project initiated and undertaken by the IT manager. The concepts of organisational culture and IT governance (introduced in Part 2) are applied as necessary to aid interpretation.

A more substantial decision made by the IT manager in 1994 was to initiate a "Linkages" project designed to develop software gateways between some of the Organisation's key information systems (Brodie 1993: 17), with the aim of achieving enhanced intercommunication and data exchange among them. The stated aims of the Linkages project were to reduce the level of duplication of data across the various systems, and reduce the manual re-entry of data into different systems. The project had only fairly limited ambitions, and each system was to remain largely unchanged from the users' viewpoint. Even with these limited objectives, the project underestimated the difficulty of achieving compatibility in data interchange among the systems. Because the systems were not based on relational databases, the task of making them intercommunicate was made more difficult.

The Linkages project conformed generally to the IT manager's perceptions within the IT governance framework (e.g. Shipley 1995; section 2.5), as regards the independence of branches and their systems (as discussed in section 3.7.2). Nevertheless the implicit, unstated aims of the project were to achieve a greater (albeit limited) degree of coordination and integration across systems, and therefore across branches. This essentially confronted and challenged the autonomy of individual branches and their systems - intrinsic components

of the implicit IT governance, the organisational structure and organisational culture (see section 3.7.2). Neither the IT manager nor any business managers made any significant attempt to reengineer the business processes involved, including their manual components (Hammer 1990) - but this would have been essential for the project to be successful. There was also little attention given to the proper management of technological change, and its associated requirements (e.g. Brewer 1995; Preece 1995).

The Linkages project was seen by many as an imposed and inappropriate technological solution to a situation which was not even widely agreed on as being a deficiency. Some areas made written submissions to this effect, saying that their current systems were completely satisfactory to them, and that there was no business requirement to change them. One system manager commented that the Linkages project had initially concentrated on the technical aspects of system development, to the virtual exclusion of consideration of existing business processes, how they differed across branches and how they would need to be changed. The project management team consisted solely of the IT manager and Central IT professionals - no actual users were included in it.

One system manager said, "The project was nearly finished before they got around to tackling the problem of different areas having different interpretations of the same thing." At that stage a number of system managers and users were asked to put in a substantial effort to overcome this problem. Because they had not been warned of this earlier, they saw it as a great imposition, and there was no consensus on how it should be addressed. One system manager said, "I spent weeks in meetings trying to get the users from four branches to see eye to eye. They couldn't even agree on how to enter the definition of a product - the most basic item of data we have. One would want to put it one way, the others were different. None of them would budge an inch. They said, 'that's the way we do it now, and that's the way it has to be.' I went round and round with them all on that, with no success. That was about the time I realised the project was doomed. I was glad to get out of it."

At one point the IT manager was absent, and a certain system manager temporarily replaced him as Linkages project manager. The system manager reported that he found the project documentation and monitoring mechanisms insufficient, and also questioned the assumed benefits in relation to the effort required. He documented his findings and reported them to senior management, and recommended the project's termination.

The technocratic style of the IT manager, his failure to adequately consult or involve stakeholders, his secrecy concerning the details of the Linkages project and his inadequate project management all did nothing to raise the level of acceptance of the project within the Organisation. The outcome was that after running for about twelve months the project was strongly questioned and eventually opposed by both system managers and business managers, and was ultimately shelved by senior management.

The project had only limited objectives and yet was resisted by its major stakeholders, influenced and informed by the prevailing values of the IT governance and the organisational culture. From their perspective, the project did not make good sense, was threatening and was therefore opposed. If it was to be successful, it would have required a much greater degree of commitment by managers at all levels. If the project had attempted to integrate processes and systems on a larger scale, for example in the form of enterprise integration (Janet 1996; Mink et al. 1991), it would most probably have been resisted even more strongly.

Majchrzak and Wang (1996: 93-95) describe the considerable difficulty of "breaking the mind-set" (that is, changing the cultural values) of organisations which are structured around discrete "functional silos". They also found in their applied research that if such organisations are for some reason unable to create a fully collaborative culture with a collective sense of responsibility, they may benefit more from simply strengthening the ties between functions, than from more extensive attempts to integrate functions and data (Majchrzak and Wang 1996: 95-96). This implies that from an objective viewpoint, the

Linkages project was reasonably sound in its basic concept. This was supported by the fact that an external audit carried out in 1996 recommended the reinstatement and completion of the project. However from the perspectives of internal employees, it was seen as unsound.

The general behaviour of the IT manager was tolerated for some time, but with rising frustration on the part of those affected. During 1995 and 1996 his unsubstantiated technocratic style was increasingly strenuously opposed. This opposition coincided with his championing of a particular technology (client/server computing), which he proposed as the Organisation's future principal IT strategy, and which he made the centrepiece of a draft IT strategic plan produced for the Organisation (discussed further below).

The IT manager's perceptions and practice as revealed through a key earlier IT project were critically examined in this section. The initial stages of the IT strategic planning process, in which the IT manager was also a key player, are the subject of the next section.

3.7.7 Information technology strategic planning

This section describes and analyses the initial stages of the approach to IT strategic planning taken by the Organisation. The theoretical concepts of symbolism and the rational approach to strategic planning (introduced in Part 2) are utilised as necessary, to aid understanding. It is noted that the Organisation initially aimed to follow the government's guidelines for ITSP. These are identified as falling firmly within the rational approach, and are criticised as such.

After the shelving of the Linkages project and partly as a result of this, an attempt was made in late 1995 by the IT manager, with the support of the CIO, to expand the role of the IT section, to include:

> " coordination and participation in the planning and management of all IT activities undertaken within or for the [Organisation]; and
>
> . planning and development of [Organisation] specific policies on IT matters and managing their implementation." (IT section role statement 1995)

It was also proposed that the IT section would increase its emphasis on the introduction of new technologies into the workplace. All of these proposals amounted to an attempt by the IT manager to institute - again albeit in a limited way - a stronger corporate role for the IT section with correspondingly increased powers, and a greater degree of coordination and integration of IT across the Organisation. The proposed new role of the IT section, and in particular its corporate IT planning function, represented a significant change from the prevailing situation in which each branch had primary responsibility for planning its own IT functions and services. There was a considerable degree of tension and some overt conflict in the Organisation concerning the proposal. In public, the system managers simply questioned the need for a stronger corporate IT focus, arguing that if any function needed more support and resources, it was theirs. However a typical private comment concerning the IT manager was, "He's just trying to build an empire for himself, but we simply don't need it."

The proposed role statement for the IT section added that:

> "This change will mean that system managers and their section managers will assume more responsibility and accountability for their use of systems and local management of IT in their area.... The prime responsibility for optimising work practices, including the application of IT.... will remain with line areas." (IT section role statement 1995)

These additional role statements were curiously inconsistent with the proposed corporate role of the IT section, but in fact reflected a recognition by the IT manager of the continuing major role of the branches within the IT governance framework. They also served to underline the fact that the IT manager's perceptions also remained to a large extent firmly within that framework.

Since 1987, government agencies had been requested to develop a corporate information technology plan covering three years, and to review it regularly. Guidelines were issued to assist agencies in this process, entitled "Developing a *business driven* IT strategy" (Finance 1991). These guidelines strongly emphasised the role of "business" in the development of an ITSP, with this term being a synonym for the *raison d'etre* of the agency (Finance 1991: 7). The guidelines were strongly recommended, but were not mandatory. The guidelines were re-issued in 1995 by the central IT policy agency at the time, the Office of Government IT. They were based on a similar approach to IT strategic planning developed in the United Kingdom by the government agency with overall responsibility for IT (CCTA 1988, 1989).

The government's guidelines dealt only with IT strategic planning, but encouraged agencies to plan for IT in the context of their entire information activities, that is, within a "Total Information Management" context. The guidelines aimed to closely integrate corporate and IT planning by focussing initially on business needs and objectives, and then identifying the optimum IT strategies which could fulfil and complement them (Finance 1991: 1-7). The guidelines noted that the ITSP process was iterative in nature, and depended on monitoring the performance of the chosen strategies, comparing them against previously defined business and IT performance indicators and adjusting the strategies as necessary. The guidelines also aimed to focus on strategic as opposed to operational issues, without however offering a means of distinguishing between the two, or even acknowledging that there was any potential difficulty in doing so (compare Rumelt 1979: 197; discussed in section 2.3.1).

All IT strategic planning for the Organisation had previously been undertaken by the Central IT division of the parent department, which included rudimentary IT plans for the Organisation within its wider departmental IT plan. The approach taken to the Organisation's IT needs could be described as "minimalist", that is, the previous plans had envisaged only ongoing routine maintenance and support of the Organisation's systems, to be implemented with minimum effort. No overall vision or fundamental change to the Organisation's future IT environment was expressed or apparently even contemplated.

In 1995 the Organisation's IT steering committee noted that the previous ITSP for the Organisation (produced in 1993 and included in the parent department's ITSP for 1993-96) was no longer fully relevant to the needs of the Organisation. It was decided that the Organisation should develop its own ITSP, which would complement the business strategies and plans of both the Organisation and the parent department. The ITSP process originally aimed to support the business directions of the Organisation as outlined in its strategic management plan of 1994, including enhanced cooperation, communication and teamwork among the branches and sections. It was originally envisaged that the process would include consultation with all relevant stakeholders, including branches, committees, clients and the parent department. Where possible active participation and contributions would be sought.

In addition to dissatisfaction with the earlier approach to ITSP taken by Central IT, the ITSP process was initiated for several reasons, including the impetus of the Organisation's 1994 corporate strategic plan, which placed some pressure on management to develop a corresponding IT strategic plan. There was also some degree of rising dissatisfaction within the Organisation over the inadequacies of its simplistic "Type 1" information systems - which was itself linked to the dissatisfaction with Central IT. However this focussed mainly on the deficiencies of individual systems, and did not extend to any widely shared perception of a need to better integrate and coordinate them.

The government's ITSP guidelines proposed a set of "fundamental principles" of IT strategic planning, namely that ITSP:

(a) is the concern of corporate senior managers,

(b) is one element in an integrated business planning process,

(c) provides valuable input to the business planning process,

(d) is driven by business information needs and flows rather than the technology,

(e) is driven by user-defined needs and priorities,

(f) is directly based upon and supports business objectives,

(g) demonstrates measurable benefits to the agency,

(h) is owned by the users, is readily understandable by all agency staff, and has the

commitment of the IT providers,

(i) reflects the size, structure, IT skills and maturity of the agency and the importance of IT to that agency,

(j) is capable of guiding the development of the strategy on an ongoing basis,

(k) drives the operational IT plans,

(l) is primarily the agency's internal management tool, produced for the benefit of the agency, and

(m) is consistent with government IT policies (Finance 1991: 8-10).

Initially the ITSP process aimed to follow the government guidelines. However this approach was effectively undermined in the Organisation by the IT manager, who acted to severely limit the involvement of senior managers and business managers in the process. In fact his approach ignored or paid only lip service to many of the fundamental principles of the government's ITSP approach, namely all of principles (a) to (h) above.

The ITSP process in the Organisation was driven by the IT manager with the tacit support of the CIO, but without significant support from any other directors or managers. The IT manager manipulated "ITSP" as a private symbol or *emblem* in many situations (e.g. Firth 1973; see section 2.4.2) - that is, when he referred to it in discourse he implied certain connotations and understandings without explicitly identifying them. These understandings were not general in the way that cultural symbols have common meanings shared by many members of the culture (as discussed in section 2.4.2). They had been privately formulated by the IT manager - however he sought to promote and propagate them more widely. For him, the connotations of "ITSP" as an emblem included:

- an assertion of a greater degree of autonomy of the Organisation, and greater independence from Central IT on IT matters;
- enhanced maturity and professionalism of the Organisation in terms of IT;
- a potentially expanded role and responsibilities for both the IT section and the General Services branch; and

- potentially enhanced status and prestige for both the IT manager and the CIO.

Although the IT manager would not openly declare his understandings of "ITSP", he would discuss them privately to some extent with the IT section and the researcher. Perhaps predictably, when the system managers gained an idea of what his understandings were, they reacted in a manner similar to their earlier response to the proposed expanded corporate role of the IT section. A typical comment concerning the IT manager's desire for independence from Central IT was, "The simple fact is, the [Organisation] is part of the department, and we get our IT from [Central IT] - and that's all there is to it. It doesn't matter what some people go around saying, that's the way it is." For the system managers, the connotations of "ITSP" as an emblem therefore included:

- potentially enhanced status and power for both the IT manager and the CIO;
- potentially increased resources for both the IT section and the General Services branch;
- potentially reduced status and influence for the system managers; and
- potentially reduced resources for the system managers and the branches.

The IT manager also used reference to "ITSP" as an emblem as a means of promoting the technology which he had preconceived as an ideal solution for the Organisation and as its principal IT strategy: migration to a client/server computing environment (this is discussed further below).

A small working party was set up to coordinate and undertake most of the work of developing an ITSP for the Organisation. This consisted of the IT manager, the assistant IT manager and a system manager. At the suggestion of the assistant IT manager, the process initially aimed to follow the government's "rational" ITSP guidelines (Finance 1991). Accordingly it was initially agreed that the ITSP would be developed by means of a process which included addressing the following questions, in logical order:

- Where are we now?
- What's good and bad about this situation?
- Where should we go, and why?
- How should we get there?
- How will we know we're getting there?

The ITSP development project therefore initially aimed to include the following broad phases:

(a) *Investigate the current environment of the Organisation*

The current internal and external environments of the Organisation would be investigated and documented, covering both business and technical aspects. This would include aspects controlled by both the Organisation and by Central IT.

(b) *Assess the current environment of the Organisation*

This would aim to assess the strengths and weaknesses of the internal environment, and judge the potential opportunities and threats posed by the external environment.

(c) *Identify the target environment of the Organisation*

This would aim to identify the most important business and technical strategic forces and imperatives, leading on to the identification of key strategic directions. The various possible target environments which could fulfil these strategic directions would be identified. For each possible target environment the advantages and disadvantages (from both the business and technical perspectives) would be considered. This would consider the impacts on the Organisation, the Organisation's clients and the parent department. The preferred target environment would then be identified and defined.

(d) *Identify strategies for reaching the target environment*

Various possible strategies would be identified and assessed, considering the potential advantages and disadvantages of each (from both business and technical perspectives), their approximate cost estimates and estimated time frames for completion.

(e) The *preferred strategy would be identified*, including consideration of the required IT roles and responsibilities, migration to the target environment, management of organisational change, evaluation of progress, performance indicators and critical success factors.

(f) The *ITSP would be implemented* via an IT tactical plan, which would follow the strategic directions set by the ITSP, and would consist mainly of plans for proposed IT projects.

The main perceived strengths and weaknesses of the current environment were informally discussed among the system managers in early 1996. There were some nominated weaknesses which some system managers strongly disputed. These included "there is poor coordination and integration among the branches and their systems" and "the responsibilities for corporate data are not well identified." Their opposition was based not so much on outright disagreement with the statements, as on the perception that they were not really relevant. That is, it was not widely felt that poor coordination and integration were in fact major weaknesses. The resulting list of deficiencies was restricted to significant perceptions common to many systems, such as the fact that many of them were considered not to be "user friendly", their user interfaces were seen as inflexible, and they were seen to have poor reporting and enquiry facilities.

The more detailed aspects of the draft ITSP prepared for the Organisation are not relevant to this thesis, as the full ITSP document was never shared or discussed beyond the small

working group which developed it. Before this could happen, the IT manager put the process "on hold", and it was later abandoned by senior management. Moreover within the small development group, the IT manager showed little interest in the finer details of the ITSP process or the draft plan, preferring to focus on his understanding of "ITSP" as an emblem, and focussing even more strongly on his preconceived strategic target, client/server computing. The IT manager in fact rejected and overruled the rational approach based on the government's ITSP guidelines in favour of a processual approach to strategy formation (e.g. Mintzberg 1994; discussed in section 2.3.2). His approach was based largely on intuition and anecdotal information (discussed further in section 3.7.7.2 below).

The government's ITSP guidelines fell squarely within the "rational" approach to strategic planning (e.g. Ansoff 1990; see section 2.3.1). A number of criticisms have been made of this approach, and of specific aspects of it. For example, the guidelines recommended undertaking an evaluation of the strengths and weaknesses of the organisation in relation to its mission and goals (Finance 1991: 28-29). However no organisation can be sure whether a capability it possesses will prove to be a strength or a weakness over time, because "strengths and weaknesses can be detached neither from each other, nor from specific contexts, or from the actions to which they are directed" (Mintzberg 1994: 279; discussed in section 2.3.1).

Mintzberg (1994: 294-297) also notes that within its typical series of procedural steps, at the heart of the process where strategies are supposed to be created, there are often only "empty checklists" (as noted in section 2.3.1). This tended to be generally true of the government's guidelines - for example, they recommended developing an IT strategy which:

> " identifies the future business direction;
>
> . sets out how IT will support [it];
>
> . translates that vision into a statement of the way forward in terms of information systems, infrastructure, organisation, [and] policies; and

sets out the major business benefits...." (Finance 1991:42).

No real insight was offered as to how to overcome the very considerable challenges implicit in this simplistic recipe. Mintzberg (1994: 298-303) also criticises the overall analytical basis of the rational approach, in which the whole process is reduced to a complex series of procedural steps, with a "tendency to substitute mechanics for thought" (see section 2.3.1). Rather than being analytical and sequential, successful managerial work is more typically simultaneous and holistic (Mintzberg 1994: 319-321). In practice, "The process of strategy formation simply has different needs - for creativity and synthesis, which depends on the discretion of informed actors. The work of creating strategy cannot be programmed like that of shoveling coal" (Mintzberg 1994: 302-303). Again, this criticism applies to the government's guidelines.

The initial phases of the ITSP process in the Organisation were described and analysed in this section. These were identified as following the government's rational guidelines for ITSP, which were also criticised. The next two sections outline the nature of the principal strategy promoted by the IT manager - client/server computing - and its significance as a strategy for the Organisation.

3.7.7.1 Client/server computing

This section consists of a brief summary of client/server computing as a technology *per se*, and its implications in general. The Organisation's IT manager formulated a personal, intuitive vision of client/server computing as the ideal future IT strategy for the Organisation, and this is discussed further in section 3.7.7.2.

Client/server is a computing model in which the application processing is partitioned to a significant extent across multiple processors, which cooperate to complete the processing as a single integrated task (Boar 1993b: 102). A recent study found that 36 of 42 Australian

public sector organisations surveyed were implementing, or planning to implement client/server computing (Finance 1995: 133-136). However client/server is a complex area, and there is a large body of related literature. Recent comprehensive studies include Adhikari (1994), Boar (1993b) and Finance (1995).

Client/server has emerged as a major paradigm shift in computing in the 1990s. The move to client/server may be compared to earlier paradigm shifts in computing, such as the shift away from punched cards in the 1960s (Dec 1995a). At that time the alternatives cost more, and demanded new techniques, skills and resources. The alternatives prevailed because of their superior business value, and today punched cards are rarely seen.

In its simplest form, a client/server computing application consists of components which are divided in some way between a "client" and a "server". Typically, the client and the server are separate computers connected via a network (however they need not be). The components of a client/server system are co-ordinated by intermediate software (or "middleware") which generally uses remote procedure calls (RPCs) to conduct messages between client and server. Client/server systems often utilise an open architecture - that is, they are readily portable to other environments. They also often use graphical user interfaces. However they need not necessarily have either of these two features (Adhikari 1994: 5).

The key potential advantages of client/server computing include enhanced productivity and effectiveness, enhanced direct control of systems by users, greater flexibility, improved access to information, enhanced user interfaces, improved customer service, and improved portability and scalability to other environments (Adhikari 1994: 19-20, 63-66; Dec 1995b; Finance 1995: 19-38). An important characteristic of a client/server environment is its high level of staff participation in most aspects of application systems, including their design, operation, maintenance and enhancement. This is generally seen as an advantage, however it may not be in some organisational contexts. Many of the benefits of client/server are qualitative, and do not lend themselves readily to cost-benefit analysis (e.g. Adhikari 1994:

127-128; Dec 1996a). This does not necessarily mean that they cannot translate into quantifiable gains in the longer term - however these are difficult to predict in advance.

The key potential risks associated with client/server computing as compared with mainframe systems have been identified as likely higher costs, increased complexity, reduced security, reduced reliability, increased staffing requirements, the need for new skills, increased training and limited system management tools. Another significant issue can be unrealistic expectations of client/server on the part of employees, and the management of such expectations (Adhikari 1994: 20-28; Finance 1995: 39-82).

The costs of client/server versus traditional mainframe-based approaches is a contentious and inconclusive area, with few hard facts. The weight of available evidence suggests that in monetary terms client/server costs significantly more than mainframe, at least in the earlier stages (Dec 1995a; Finance 1995). However no fully controlled comparisons have been made. It is widely held that the business drivers of client/server are factors such as productivity and flexibility, not direct cost reduction - and that it can be difficult to quantify the benefits initially (e.g. Adhikari 1994; Dec 1996a). Organisations contemplating client/server usually aim to balance the likelihood of increased costs in the short term against the potential business benefits in the long term.

Client/server systems are likely to be more complex than the equivalent mainframe-based systems, because a greater number and diversity of components interact with each other - usually across a network, which can add another level of complexity (e.g. Adhikari 1994: 26). Interfaces among systems are also likely to be more complex. Proper management of the client/server environment is therefore crucial, including all interfaces among systems. Early success with a relatively simple pilot project runs a risk of leading to "short cuts" being taken - but this can increase the risk of failure later on as more complex projects are undertaken (Williams 1995).

The technical skills and competencies required for systems development, maintenance and management in a client/server environment are considerably different from those needed for a mainframe environment, although many of the mainframe disciplines remain essential (Adhikari 1994: 24-25). In one survey, over 50 per cent of respondents cited "lack of qualified personnel" as their major obstacle to implementing client/server.

Client/server computing in general, and its potential benefits and risks, were outlined in this section. The next section examines the implications of client/server as a short-lived strategy of the Organisation.

3.7.7.2 Client/server computing as an Organisation strategy

This section describes and analyses the key strategy proposed and promoted by the IT manager - client/server computing - and its implications within the Organisation. The concepts of symbolism and the processual approach to strategic planning (introduced in Part 2) are applied as necessary, to assist interpretation.

In 1995 the IT manager had been sent by the Organisation on an overseas tour to study the approaches to IT taken by other organisations. He provided feedback to the CIO after these visits. In some such cases it appeared that the organisation had successfully migrated, or was successfully migrating its information systems to a client/server environment. As a result the IT manager developed a personal conviction that client/server computing should form a major part of the future IT environment of the Organisation, and that this would confer significant advantages. However the IT manager did not investigate in any detail the pre-existing structure, functions or systems of the other organisations, or the actual nature of their "client/server" migrations. Their situations may not have been comparable to that of the Organisation, and their solutions may not have been directly transferable to the Organisation.

The IT manager based his understanding of "client/server computing" largely on his personal experience and intuition. He did not apparently refer to the literature to broaden his understanding of the concept (e.g. Finance 1995, 1996). He also did not discuss the topic in any depth within the IT section, and moved to block any organised discussion of it by the system managers by preventing their meeting formally, after they had shown signs of questioning the proposed strategy.

The client/server strategy as formulated by the IT manager, although deliberate, fell within the processual school of strategic planning (e.g. Mintzberg 1978, 1994; see section 2.3.2), to the extent that it was subjective and intuitive, and based on qualitative and anecdotal information. The IT manager in fact chose to circumvent the rational approach originally adopted by the small ITSP working group, and replace it with a deliberate, single-minded goal of achieving a migration to a client/server environment.

For his part, the IT manager often manipulated "client/server computing" as a private symbol or emblem (e.g. Firth 1973; see section 2.4.2). He had only limited technical understanding of the issues involved in client/server computing. For example, he apparently thought that mere "migration" of the existing information systems to "client/server", without change to their functionality, would somehow act to overcome many of the considerable deficiencies of the systems. This specifically included overcoming the poor access to information both within and across the systems, the high costs of maintenance and the lack of "user friendliness" of the systems.

The IT manager's interpretation of "migration to client/server" in fact simply entailed "conversion" of the systems to Oracle relational database management systems, running on local midrange computers within the Organisation. From sources in other organisations he had formed a conviction that automated means were available to convert the existing mainframe-based, non-relational database systems to relational systems which would run on midrange computers. Despite this being investigated by Central IT, it was not fully confirmed, and remained in some doubt until the ITSP process was terminated, and it had

little further relevance. Certainly in the two cases of "migration to client/server" which the IT manager was able to initiate, there was no automated conversion, but rather full redevelopment of the systems was commenced in Oracle on the mainframe.

One system manager said of the IT manager's views, "He sees 'client/server' as some kind of silver bullet which will solve all our problems in one fell swoop - unfortunately it's not as simple as that. He's only acting on a hunch." For the IT manager, when he referred to "the ITSP" he also focussed strongly by implication on his proposed strategy - migration to client/server - and he used reference to "ITSP" as a means of promoting his vision. When the IT manager referred to "client/server" in discourse he implied all of the connotations of "ITSP" as an emblem (as noted in section 3.7.7), plus certain additional connotations of "client/server computing" as an emblem, which included:

- greatly enhanced access to information by the Organisation's users and managers;
- greatly enhanced "user friendliness" of the Organisation's information systems;
- greater independence and control by the Organisation over its own information systems;
- freedom from the perceived restrictions of the parent department's mainframe;
- reduction of the perceived high costs of services provided by Central IT;
- freedom from the perceived substandard services provided by Central IT; and
- improved reliability and responsiveness by elimination of reliance on the telecommunications link to the parent department's mainframe.

The IT manager often emphasised an alleged unreliability and lack of responsiveness of the telecommunications link. However the system manager who had the most direct involvement with the link maintained that there were few problems, and that the relevant telecommunications reports demonstrated this. At best this issue remained inconclusive.

Many of the system managers had serious doubts about the potential value of client/server computing *per se*, and some believed that although client/server might confer some benefits, the costs would be likely to be excessive. This last view was also held by some influential managers in Central IT. Many of the system managers therefore developed their own understandings and connotations of "client/server computing" as an emblem. All of these were seen by them in a negative light, and collectively they included:

- the likelihood of a greater concentration of power in the IT section and the General Services branch, and specifically in the person of the IT manager;
- the likelihood of greater ongoing costs;
- the likelihood of greater complexity in the IT environment;
- the likelihood of reduced reliability of the Organisation's information systems;
- the likelihood of reduced security in the IT environment; and
- the likelihood of increased responsibility and work for the system managers, without any additional resources or training.

The negative connotations of "client/server computing" were also linked by association by these system managers to "IT strategic planning", as it was applied within the Organisation. That is, in many ways the referents of "client/server computing" and "IT strategic planning" as emblems, as understood by many system managers, were diametrically opposed to the understandings of the IT manager.

The two sections above have described client/server computing in general, and drawn out its implications as an Organisation strategy as promoted by the IT manager. In the light of this discussion, the next section continues the examination of the ITSP process in the Organisation (commenced earlier).

3.7.7.3 Further development of the IT strategic plan

This section discusses and analyses the continued attempt to develop a client/server-based ITSP for the Organisation. The theoretical concepts of organisational culture and IT governance (introduced in Part 2) are applied as necessary, to enhance interpretation.

Initially the IT manager aimed to involve the system managers in the ITSP process, as he perceived that their support would assist in gaining acceptance within the Organisation for his proposed strategy. Within the organisational culture and also within the IT governance framework, it was legitimate to discuss and decide issues within small, expert groups. The IT manager therefore chose to hold a one-day workshop session with some key stakeholders to accelerate the process of developing the ITSP. These included the system managers, representatives of a few business units and staff from Central IT. Selected discussion papers were sent to attendees in advance of the workshop. These included summaries of the main information systems, the advantages and disadvantages of the current systems environment as perceived by the IT manager and some reviews of client/server computing.

Despite the fact that the IT strategic planning process could not reasonably be expected to develop in one day complete and effective IT strategies for the Organisation, the IT manager nevertheless insisted that the workshop should discuss the details of a migration to client/server - which should logically have been a later phase of the ITSP process. Accordingly the stated aim of the workshop was that a first draft of the ITSP should result from it, and this was supported by the CIO. The workshop agenda therefore originally aimed to follow an ambitious pattern which conformed to the government's ITSP guidelines (Finance 1991), including full discussion of the following stages (as noted in section 3.7.7):

- Where are we now?
- What's good and bad about it?
- Where should we go, and why?

- How do we get there?

In fact, the IT manager had little interest in the first two, but wanted to focus as soon as possible on his proposed client/server strategy. The earlier sessions of the workshop included an overview of the government's ITSP guidelines. The workshop followed the set agenda for only about its first half, reaching the point of starting to discuss, "Where should we go, and why?" At this point it became apparent that there was a strong current of opinion among system managers to the effect that the highest priority should be to first identify the key business requirements of the Organisation. Only after these were identified should technical solutions be considered. The representatives of Central IT also supported this view, and the IT manager's opinion to the contrary received no support.

It was then acknowledged that although various documents did exist which addressed the Organisation's business requirements (including the "strategic management plan" of 1994 and the few existing business plans), there was no document available which defined the business needs in a form readily suited to identifying IT solutions. It was accordingly agreed that the latter half of the workshop should be devoted to a discussion of key business needs, with a view to their implementation via IT methods.

After the workshop, a record of it was distributed to attendees for their review. The feedback on this from system managers included the comments:

> "We are wasting our time.... focussing on parts of the solution e.g. client/server. Instead we need to focus on determining what our business requirements are, and then how systems can help achieve these."
>
> "System managers together with their respective users and branch directors need to establish the business requirements for each system/function undertaken, with a view to developing business cases to justify enhancements or redevelopments. It should then be [Central IT's] responsibility to propose technical solutions."

The comments reflected the prevailing view that business requirements could and should be determined for each existing function and system individually. The alternative, not widely supported, would be to adopt a top-down approach to identifying functional business requirements, across the boundaries of existing branches and systems.

Nevertheless it became apparent that some of the system managers wanted to discuss the proposed client/server strategy in depth, and the technical justification for it. However at this stage the IT manager moved to prevent as far as possible their subsequent meeting as a group, and later moved to block their further involvement in the ITSP process itself. The system managers never again met as a full group during the study.

The subsequent compromise process agreed between the IT manager and the CIO was that a draft statement of the Organisation's key business requirements would be prepared, based as far as possible on the workshop's output. This document would then be distributed for discussion to the system managers, followed by the branch directors and section managers. The document would then be expanded to define the desired target environment and strategies for reaching it.

The small ITSP working group of three then took on the task of documenting the Organisation's business needs. An initial draft statement was prepared, focussing in particular on aspects which would most need to be considered in the future IS environment. The IT manager deliberately sought to emphasise business needs which were understood to be capable of being met by client/server computing (see section 3.7.7.1). For example, the document highlighted the need to improve efficiency, increase the level of control over systems by users, improve access to information and enhance the user interfaces. The draft statement was distributed for review to the system managers in mid-1996. Only a few minor comments were received and the draft was updated accordingly.

The draft statement of business needs was then distributed to the branch directors and the section managers. A covering note added that it was intended that an ITSP would be developed based on the business needs, and that the ITSP would be implemented via an IT tactical plan. The latter would include requirements for individual IT projects.

As a result, only one set of comments was made and circulated to all managers, from a section manager who would shortly replace the CIO as director of General Services branch (and thereby become the IT manager's supervisor). The comments included:

> "The aim should be to... set out the strategies and activities... e.g. 'one of the strategies for (re)development of any system is to identify the business rules which apply to the particular system on which the work is being undertaken'."

The comment in general reflected the widespread view that the only real action in support of the Organisation's objectives occurred at the branch and system level. This in fact reflected the prevailing view within the implicit IT governance framework and the organisational culture.

The IT manager responded to the effect that (and this was also copied to all managers):

> "The overall IT strategic planning process is in accordance with government guidelines for ITSP, entitled 'Developing a *business driven* IT strategy'.... This is regarded as the best means of achieving a co-ordinated approach to meeting the [Organisation's] corporate IT needs for the future, as opposed to potentially inconsistent local actions involving individual systems and units. The IT strategic planning process aims to support the corporate business objectives...."

This response and the ITSP process in general were apparently perceived as a threat to the autonomy of the branches, as shown further below. Both system and business managers had been explicitly promised that they would be consulted during the development of the ITSP. This did occur to the limited extent that they were invited to comment on the draft "business

requirements" document. However they responded only sparingly, to some extent because they were unaccustomed to being consulted. After this the IT manager chose to block any further consultation. Because they had been promised further involvement, some managers resented the fact that it was not forthcoming. However within the prevailing norms of the organisational culture, wide consultation and participative decision-making were rare, and generally seen not so much as being inappropriate, but simply being not relevant within the Organisation (as discussed in section 3.3).

The ITSP process was debated at the next branch directors' meeting, and resulted in acrimonious disagreement. One director took up the criticisms made by his section manager (as summarised above), and embellished on them in the form of an attack on the credibility of the IT manager. He argued for the termination of the corporate ITSP process, and for the reinstatement of the previous situation in which each branch had the primary responsibility for planning its own IT functions and services. The CIO vigorously countered this attack, and strongly argued for the retention of the corporate process.

A draft full ITSP was then prepared by the working group in the same manner as the earlier "business requirements" document. The full ITSP aimed to cover all aspects of information, information management, information architecture, information systems, IT and telecommunications. The plan aimed to support the business strategies and directions of the Organisation and the parent department, to complement the IT strategies of the parent department, to enable business improvements and to reflect government policies. The ITSP was intended to cover five financial years. Although the full ITSP aimed to respond to key business requirements, it was noted in the plan that the process entailed a constructive partnership between IT and business.

However before the draft full ITSP could be distributed to any other employees or stakeholders for review, the ITSP project was temporarily suspended by the IT manager - partly due to the rising level of negative criticism of it, and partly due to uncertainty surrounding a downsizing of the Organisation (discussed in section 3.7.7.4). Nevertheless

the IT manager continued specifying to Central IT that certain further systems were to be "converted to client/server", and attempted to reach agreement with them in terms of required resources and timetables.

The sections above described and analysed the overall ITSP process in the Organisation, including the significance of the principal strategy proposed by the IT manager, client/server computing. The ultimate outcomes of the ITSP process are described in the next section.

3.7.7.4 Outcomes of the IT strategic planning process

This section discusses the final outcomes of the various sets of understandings and events which made up the overall ITSP process within the Organisation. The concepts of IT governance and organisational culture (introduced in Part 2) are utilised as appropriate.

The IT manager made a number of submissions to the next branch directors' meeting. These included a unilateral assessment of the state of the Organisation's information systems, which had not been developed in consultation with the system managers. It included adverse criticism of some of the systems, and of their management. Another submission strongly recommended the reinstatement of the Linkages project (section 3.7.6), to the effect that, "It is a severe weakness in our systems.... Whilst it remains not implemented, major inefficiencies will continue in the systems.... It is recommended that [Linkages] resume upon migration of our core systems to client/server." These submissions were circulated to the branch directors a few days before the meeting, and they asked their system managers for their opinions. There was disagreement with and criticism of the submissions. By this stage, there was apparently little objective examination of their content, and the strongest criticism centred on the IT manager's perceived lack of experience and his autocratic and one-sided approach. A furore resulted, and again the directors' meeting was given over to acrimonious argument.

The IT manager had sought to deny the system managers formal power by preventing their assembling as an effective group, but he was unable to influence the informal power which they possessed within the context of the implicit IT governance and the organisational culture - and they used this to good effect to terminate the ITSP process. The ITSP process was ultimately rejected by the Organisation's system managers (in particular), largely because by this time the IT manager was widely believed to be operating beyond the limits of his expertise. In terms of the values of the prevailing organisational culture (section 3.3), this was seen as unacceptable - he had gone too far.

In early 1996 the CEO of the parent department had advised all staff that due to government budget measures, there would be a reduction in staffing of around ten per cent, and that further reductions were likely. Senior managers were asked to undertake reviews in their areas, aimed at "identifying procedures and functions which can be rationalised so as to require less staff support." It was advised that it was intended that the reductions would be achieved as far as possible through natural attrition, voluntary redundancy and redeployment of staff.

A new CEO was appointed to the Organisation in 1996, and it was later announced that the CIO would be included in the redundancies, along with some other managers. The IT manager responded to these developments in part by putting the ITSP process "on hold" indefinitely. However he deliberately encouraged the continuation of what he referred to as "migration to client/server" (that is, the redevelopment of some systems in Oracle). But by late 1996 the IT manager himself was relieved of his IT responsibilities and transferred elsewhere. One employee commented, "I believe that he brought it on himself. He's worked with most of the other branches. He had the chance to build bridges with every one of them, but he burnt them all."

It became clear at that point that the ITSP process within the Organisation was terminated. Although from an external perspective the process might be regarded as a "failure", the actual outcomes were logical and made sense to most participants within the specific context

of the Organisation. In fact, from their perspective the overturning of the client/server strategy was a successful result. The reasons for this lay primarily within the precepts of the IT governance and the organisational culture (see sections 3.3 and 3.7.2).

The sections above described and critically analysed the various perceptions and behaviours which constituted the IT strategic planning process in the Organisation. The next section provides an overview and appraisal of the case study as a whole.

3.8 Review of case study

This section consists of an overall review and assessment of the case study. It summarises the most significant features of the case study and provides analytical comments on them, including some inferences not previously discussed. The review explicitly draws on the relevant theoretical approaches and areas of literature introduced in Part 2.

The research method used the principal field technique of cultural anthropology, participant observation (e.g. Spradley 1980; see sections 2.4.3 and 3.2). A key anthropological concept, organisational culture, was introduced and investigated to help elucidate the ITSP process (e.g. Duncan 1995; sections 2.4.1 and 3.3). The case study aimed to investigate the structures, processes and values which applied within the Organisation, focussing on the questions:

- Why was ITSP undertaken by the Organisation?
- How was it attempted?
- How and why was it opposed?
- Why did it apparently fail?

The ITSP process was instigated largely as a perceived need following an earlier corporate strategic planning process, which created impetus for the Organisation to develop its own corresponding IT strategic plan. In addition, there was rising dissatisfaction within the

Organisation over the perceived deficiencies of its information systems, of the delivery of IT services by the Central IT division, and of the earlier ITSP produced by Central IT (see section 3.7.7).

The Organisation's ITSP process first attempted to follow a rational approach (e.g. Ansoff 1990; section 2.3.1), based on the government's ITSP guidelines (Finance 1991; section 3.7.7). Mintzberg (1994: 213) suggests that rational planning is often undertaken by an organisation in order to create an illusion of control over its problems, without actually solving them. If the organisation plans formally, the argument goes, all will be well. Governments in particular are prone to this illusion of control, and often impose formal planning processes on their agencies. The cases of both the Organisation and the wider government context illustrate this point.

The IT manager overruled the initial rational ITSP approach in favour of an intuitive, highly focussed client/server strategy which fell within the processual school of strategic planning, and was based more on soft, anecdotal information (e.g. Mintzberg 1994; sections 2.3.2 and 3.7.7.2). In the terms of the processual school, this strategy might in fact have been successful. However its weakness was that it was not "intuitive" in a way which was acceptable within the precepts of the implicit IT governance and the organisational culture - it was not based on acknowledged substantial IT experience, and it failed to complement or reinforce the existing strong functional autonomy of organisational units (see sections 3.7.7.3 and 3.7.7.4).

Because the basic values of the scientific culture of the Organisation were deep-seated and long-established, they were highly resistant to change (section 3.3). The implicit ground rules of the IT governance framework were similarly resistant to change, especially as regards the autonomy of organisational units and their independence in IT decision-making (section 3.7.2). The IT manager's technocratic style of decision-making was in keeping with his absorption of the prevailing organisational culture. Employees understood that he was attempting to impose an arbitrary decision. In itself this might not have been questioned -

it was after all the way things were often done in the Organisation. However certainly in regard to client/server computing, the system managers eventually believed that he was operating outside his range of expertise. In this case there was little perceived expert knowledge supporting the proposed strategy, and moreover virtually all discussion of it had been thwarted by the IT manager (section 3.7.7.3).

The technocratic attempt by the IT manager to impose client/server computing was therefore opposed, and ultimately overcome - largely by the principal "carriers" of the implicit IT governance, the system managers (section 3.7.7.4). The approach of the system managers *was* soundly based within both the implicit IT governance and the organisational culture. As seen through the lens of the processual model of strategic planning, this was an emergent IT strategy (e.g. Mintzberg 1994; section 2.3.2). In effect, the system managers re-asserted the dominant implicit strategy - based on the autonomy of organisational units, which formed a key aspect of the organisational culture. In terms of the model presented in Diagram 2 (in Part 2), the structure and culture of the Organisation shaped its actual IT governance and IT strategy. These in turn reinforced the principles of the organisational culture and structure.

The behaviour of the IT manager leading up to his transfer could perhaps be seen from an external stance as illogical and even self-destructive. However from within the perspective of the organisational culture, it was logical and made sense. The IT manager operated in the technocratic manner he believed to be proper within the prevailing culture and the implicit IT governance framework. The fact that he did not have abundant technical knowledge or experience was not a conscious factor in his actions, from his perspective. In many ways he was an unwitting victim of the situation.

One irony is that a different person as IT manager, with stronger acknowledged IT experience and qualifications, might have formulated a similar ITSP proposal - including a client/server strategy - and had it endorsed and implemented. The system managers and business managers might well have accepted technocratic decision-making from someone

whom they perceived to have greater legitimacy, that is, whose pronouncements were believed to be backed up by substantial technical knowledge.

This section reviewed the key features of the case study and provided critical reflections on them. Part 4 provides a conclusion to the thesis as a whole, including comments on the overall results of the research project and the fulfilment of its aims. Some inferences for future studies of IT strategic planning processes are also drawn.

PART 4

Conclusion

This thesis is a detailed study of the first attempt by a certain public sector organisation to follow a formal ITSP process. The main aim was to interpret the ITSP process as it actually operated within that organisation. A subsidiary aim was to contribute to a better understanding of the ITSP process in general. It was recognised that there are two broad approaches to strategic planning - "rational" and "processual" (see Part 2). The *rational* approach usually entails a logical, top-down, analytical approach (e.g. Ansoff 1990). The *processual* approach acknowledges that strategies can also emerge from a complex foundation of cultural and social factors (e.g. Mintzberg 1994). In the processual model, strategy formation can make good use of soft information, often drawn from the "grass roots" of the organisation.

The main conclusion of the thesis is that the overall ITSP process in the Organisation can be best understood not as a rational process, but as an emergent strategy which was shaped by the cultural understandings which applied at the "grass roots" (see Part 3). It was shown that the ITSP process was shaped by the IT governance framework which applied within the Organisation. In this respect the most significant aspects of the IT governance framework were its implicit, as opposed to its explicit aspects. It was demonstrated that the implicit IT governance framework was itself substantially influenced by key factors associated with the organisational culture and structure (e.g. section 3.7.2). One such factor was the high level of autonomy of organisational units, which was a significant feature of both the IT governance and the internal culture. It was also shown that the nature of the Organisation's information systems represented an ongoing emergent strategy which was shaped by the IT governance and the organisational culture (e.g. section 3.7.3). The management of the information systems also constituted a major component of the IT governance, and it was shown that this also clearly reflected the autonomy of organisational

units. It was demonstrated that the organisational culture itself was significantly influenced by the structure and history of the Organisation (e.g. section 3.3).

It was concluded that although the specific ITSP approach which formed the main subject of the case study might be seen as a "failure" in a sense, the overall outcome appeared logical to most participants, in the light of the perceived principles of the IT governance framework and the organisational culture (e.g. section 3.8). The ITSP approach of the case study initially attempted to follow a rational direction based on governmental guidelines. This was subsequently overruled by a certain manager (the IT manager) in favour of an intuitive, unilateral ITSP approach falling within the processual school, aimed at achieving a certain objective - namely a migration to a client/server environment (e.g. section 3.7.7.3). This approach was in turn seen by many participants as not being in accord with key values of the organisational culture, largely because the main proponent was perceived as lacking the necessary credibility to act in a "technocratic" manner. The approach was also seen as a threat to the autonomy of organisational units, and therefore not in harmony with the principles of either the implicit IT governance or the organisational structure. The approach was therefore overturned by certain major players (the system managers) within the IT governance framework - so reinstating key precepts of the implicit IT governance (e.g. section 3.7.7.4). The ultimate outcome constituted an overall emergent IT strategy, which effectively reinforced the values of the organisational culture.

The mutual influences within the triad comprising organisational history, structure and culture, and the ways in which these factors can in general shape another triad comprising IT governance, information systems and IT strategy were discussed in Part 2 and summarised in Diagram 2. Also discussed were the ways in which IT governance, information systems and IT strategy can mutually influence one another, and reinforce the premises of the organisational culture and structure. It was shown that this model applied within the organisational context studied (e.g. section 3.8).

A number of writers have sought to identify or categorise various organisational characteristics which may be associated with particular forms of IT strategy formation (e.g. Earl 1989: 40-61; Hann and Weber 1996). However while acknowledging that there is considerable variation among organisations, these approaches tend to assume that there is a common, shared understanding across organisations of the basic meanings of the terms "IT strategy" and "IT strategic planning", even if the planning methods and the details of the adopted strategies may vary.

It was concluded that in the context of the Organisation at least, the terms "IT strategy" and "ITSP" were imprecise concepts, with no unambiguous meanings in their own right. The concept "ITSP" possessed connotations which varied among different players in the Organisation (see Part 3). For example, the IT manager and the group of system managers held diametrically opposed understandings of "ITSP" as an emblem (see section 3.7.7.2). In this respect "ITSP" was a convenient label or emblem which was applied by different parties to represent their own particular understandings and interpretations.

In terms of the subsidiary aim of contributing to a better understanding of the ITSP process in general, it can be inferred that a hypothetical survey of ITSP across many target organisations would be unlikely to obtain meaningful data from the Organisation, if it did not include detailed observation. The ITSP process within the Organisation was complex, multi-faceted and rapidly changing. In the words of Geertz (1973), it comprised "a multiplicity of complex conceptual structures, many of them superimposed upon or knotted into one another.... at once strange, irregular and inexplicit" (Geertz 1973: 9-10). Depending on which employee was questioned and at what time, the conjectured researcher might be variously informed that the Organisation did not undertake ITSP, that it undertook it on a top-down basis, that it undertook it on an individual branch basis, that the ITSP process was or was not successful, that there was or was not an IT steering committee, and so on. By inference this situation might also apply in other organisations, and this could possibly call into question the validity of some wide-ranging surveys of IT strategic

planning.

It is concluded that the principal focus of an inquiry should in the first instance be a detailed study of the values and processes applying within an organisation, including the nature of its information systems and IT governance - avoiding an attempt to focus primarily on an imprecise concept such as IT strategic planning. It is also concluded that because the concept "IT strategic planning" does not have a single, commonly accepted definition, it is not yet possible to compare it meaningfully across organisations in the same way that, for example, a well understood concept such as "financial management" can be compared. This implies the need to accumulate a greater number of detailed studies of the IT strategic planning processes and understandings which actually occur within many different organisations. In this way comparative studies of IT strategic planning across organisations will in time yield more valid and valuable results.

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- parent department 1996

Audit reports
- internal 1996
- external 1996

Minutes of meetings
- branch directors meetings

IT strategic planning
- workshop record 1996
- draft business requirements 1996
- draft IT strategic plan 1996

Information system documents
- specifications
- user guides

Service agreement between Organisation and Central IT 1996

Files
- administration
- IT projects

Memoranda
- from managers
- general

Electronic mail messages
- from managers
- instruction to staff 1996
- general

Speeches
- senior managers
- political leaders

Media releases
- political leaders

Articles
- managers
- scientific employees

Staff newsletters 1996